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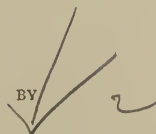
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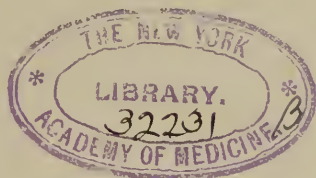
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BY 

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WITH 111 ILLUSTRATIONS

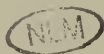


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TO

FRANK CALDWELL, M.D.,

IN MEMORY OF A GREAT SERVICE RENDERED THE
AUTHOR.

ERRATA.

Page 25, line 19, for "one drachm" read "three drachms."

Page 161, in table for fluid measure, for "one pint = 20 fluidounces" read "one pint = 16 fluidounces."

Page 162, in bichlorid table, third line, for "1 in 1000" read "1 in 1500."

PREFACE.

In preparing this volume, my purpose has been to give a concise outline of surgical nursing in general, together with a list of antiseptic agents, and the mode of preparation of the various materials used in antiseptic surgery.

This volume is written for that large body of nurses whose technical education is not sufficiently advanced to enable them to thoroughly master the subject of general nursing in all its details, as presented in the more elaborate works of physicians and surgeons, and with which it does not pretend to enter into competition. For whatever knowledge the writer may possess on the subject of surgical nursing, she is largely indebted to the surgeons of the Episcopal and Pennsylvania Hospitals of Philadelphia, whose generous assistance and never-failing kindnesses were of inestimable benefit in her professional work.

BERTHA M. VOSWINKEL.

Columbus, Ohio.

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SURGICAL NURSING.

CHAPTER I.

INTRODUCTION—CARE OF PATIENT—BEDS AND BED-MAKING—
PREPARATION OF BED FOR OPERATION—BED-SORES—FEEDING
—VENTILATION—SUNSHINE—FLOWERS—DUTY OF NURSE—
BLANK FOR CLINICAL MEMORANDA.

No doubt the greater portion of those who will be at all interested in the following pages will be nurses, who have passed through a certain period of training in one of the many hospitals in the land, where it often happens that the greater part of the time is spent in the medical wards, the nurse receiving very little practical surgical training. While the plan of work of both is similar, surgical work differs in many respects from medical work. In both cases the care of the patient is of the utmost importance, if the nurse is to fulfil her mission, namely: to care for, and minister to the sick and afflicted.

The first thing upon which the comfort and well-being of the patient depends is cleanliness and the condition of the bed. For this reason, whenever it is possible the patient should be bathed each day. If for any reason an entire bath cannot be given, the face, hands,

Introductory remarks.

Care of patient.

chest, and back should at least be bathed. It will be found more refreshing to add a little alcohol to the water in bathing the body, as it imparts freshness to the skin.

The patient should be placed between blankets to avoid the possibility of giving a chill. A good nurse will always have everything at hand before beginning to bathe the patient, thus avoiding any unnecessary delay. Care should be taken to keep the mouth and teeth in good condition, using a little Listerine for this purpose. If the patient be a woman, the hair should be neatly braided and put out of the way. It is needless to tell a nurse to keep the nails carefully cleaned and trimmed.

The ideal surgical bed should be firm and even, consisting of a good hair mattress, but without springs. In some cases, such as fracture of the thigh or excision of hip, a board is fitted to the bedstead and placed underneath the mattress, so as to give it additional firmness. As rest to the injured part forms the basis of all surgical treatment, it is advisable to make the bed with as little disturbance as possible. Unless it be absolutely necessary, the long rubber sheet should be dispensed with, as it proves a source of great trouble in keeping the bed free from wrinkles, and is generally uncomfortable. If used, it should be securely tied in place under the mattress.

In making the bed, begin at the head, tucking the sheet firmly under the head of the mattress, so that the weight of the body will not draw it into a mass of wrinkles under the back; then roll the remainder of

the sheet, or, if preferred, fold it tightly upon itself; draw it gently under the shoulders to the hips; slightly raise the latter and draw it over the entire mattress, stretching and tucking it firmly at the sides.

The cross rubber and draw sheet should be folded together in the same manner, care being taken to keep the upper end of the same sufficiently high to have the shoulders rest upon it, so as to keep it in position. This also should be tightly stretched, and kept free from crumbs and wrinkles and perfectly dry, to prevent bed-sores.

There is still another way of preparing the bed, viz.: rolling the sheet from both ends and slipping it under the hollow of the back, when it can be passed under the shoulders and under the hips, after which it can be tucked firmly under the mattress. In severe cases, where it is essential that the patient be disturbed as little as possible, two persons should make the bed. In other cases the patient may assist the nurse by grasping the headboard and elevating the shoulders, and with the assistance of one leg slightly raising the hips. In some cases, such as fracture of the thigh, or excision of hip, it becomes the duty of the nurse to see that the recumbent position is maintained, as a good recovery frequently depends upon it. For this reason in some cases, as recent fracture of the thigh or ribs, and after certain operations, but one pillow is allowed.

In injuries to the head, where bleeding is likely to occur, or where an ice-cap is used, the pillow should be covered with a mackintosh pillow slip.

Operation
bed.

In preparing a bed for a patient after an operation, if it be upon the lower extremity, the entire mattress should be covered, first, with a rubber sheet, tying it securely underneath; second, the ordinary sheet, firmly tucked; third, the rubber draw and cross sheet, followed by a blanket and the usual covering.

If the operation be a major one, after which it is not desirable to move the patient for a number of hours, it will be found very serviceable to place a small square of mackintosh covered with a piece of blanket directly under the buttocks, which can be easily removed should an accident occur, leaving the under blanket in good condition; a blanket sheet and the usual bedding completes the arrangements. The bed should be thoroughly warmed by means of hot water bags before placing the patient in it.

Bed-sores.

When a patient is obliged to lie upon his back for any length of time, great care must be exercised in order to prevent bed-sores. The skin should be washed thoroughly with Castile soap, and rubbed well, at least once a day, with alcohol and alum. If there be the slightest appearance of redness, the pressure should be relieved by the use of an air cushion or a ring made of oakum. The shoulder blades and heels often have to be protected in the same manner. If, in spite of all precautions, a bed-sore forms, use broad strips of adhesive plaster carried across the back to relieve pressure, covering in the ulcer and the surrounding skin several inches above and below. Bed-sores are especially to be guarded against in cases of paralysis, when the

patient would feel no soreness, and where the constitution is seriously impaired.

As crumbs are a source of great discomfort, the feeding of helpless patients is a matter of importance. The neck should be protected by a napkin or towel, to prevent the crumbs from slipping down ; the bed should be thoroughly brushed out after each meal. All nourishment is to be given regularly by direction of the physician. If a feeding cup be used, be sure that the spout is clean. Care should be taken to have the tray arranged as daintily as circumstances will permit ; all articles should be scrupulously clean. If the patient is to be fed, do it as though it were a pleasure to you, not a task, for under the best of circumstances it is a trying ordeal.

Proper ventilation of the room or ward is also a matter of importance. I have found nothing better than Dr. Park's definition : " Proper ventilation is clean air displacing foul air constantly and steadily without chilling the patient." To accomplish this in a hospital ward is a comparatively easy matter, by opening the windows a little from the top, either on one side of the ward or the other, preferably the windward side. Under certain circumstances, of course, they may be open wide, from both top and bottom.

Another very good way to insure ventilation is to have a piece of board, four or five inches broad, sometimes made with a hinge in the middle and of the same length as the breadth of the sash frame ; when the lower sash is raised the board may be fitted into the space left. By this method the fresh air is admitted between the upper and lower sash, at such a height from the

floor that it will not easily create a draft. If care be taken to give extra covering to the patient, in most cases the window may be opened for a few minutes with little or no risk, keeping the additional covers until the room has regained its usual temperature, which, except in special cases, should be about 68° Fahr. A nurse will frequently find that restlessness and inability to sleep are caused by improper ventilation.

Sunlight.

The matter of sunlight is also to be considered ; with few exceptions, such as injuries to the brain or eyes, the more sunlight the better, as aside from its health-giving properties it imparts a cheerful aspect to the room.

Flowers also add much to the brightness of a hospital ward or sick-room, but should always be removed at night, on account of the carbonic acid which they exhale.

Duties of
nurse
toward
physician.

Having briefly gone over what conduces to the comfort and well-being of the patient, it only remains to be said that the duties of the nurse toward the physician may be comprised in a few words: To report accurately upon the condition of the patient since his last visit, and to faithfully carry out his instructions until his return. Be careful that each direction is thoroughly understood, and never hesitate to acknowledge a mistake if one has been made. In special cases it is well to keep clinical notes, in addition to the temperature charts, showing temperature, pulse, respiration ; amount and character of urine voided ; number and character of stools ; number of hours of sleep ; exact quantity and kind of nourishment taken ; also medicine and stimulants ; symptoms and local treatment.

The most convenient form for keeping these notes, is

CHAPTER II.

QUALIFICATIONS OF SURGICAL NURSE—SYMPTOMS TO BE NOTED—

KINDS OF PAIN—DURATION—CHARACTER—FACIAL EXPRESSION—CHANGES OF PULSE—TEMPERATURE—RESPIRATION—COUGH—SPUTA—DECUBITUS OR POSITION—SECRECTIONS AND EXCRETIONS—ALIMENTARY CANAL—URINE—GAIT.

Qualifications of surgical nurse.

There are certain qualifications necessary for a surgical nurse which may be thus classified.

A Good Constitution, where strength is severely taxed.

Powers of Endurance, where vigilance is required.

Alertness, both mental and physical.

Observation, for accurate noting of symptoms.

Kindness, especially in nervous cases.

Pluck, under trying situations.

Cheerfulness, under all circumstances.

Firmness and kindness should invariably go hand in hand, for the combined display of these characteristics will often exert a good moral influence over the patient.

Symptoms to be noted.

All changes in the facial expression of the patient should be observed. Sudden pallor or loss of color may indicate syncope, or, after operation, hemorrhage, in which case the dressings should be instantly examined.

Flushing is also a noteworthy symptom; it is often found in pneumonia, when the side of the face corre-

sponding to the affected lung is flushed. This flushing will usually be seen in cases of facial erysipelas, first appearing over the bridge of the nose.

Lividity occurs in asphyxiation, when the supply of oxygen is insufficient, or where there is an accumulation of carbon dioxid.

Pain may be exhibited in various ways by different persons, but a pinched, drawn expression is a pretty sure sign that the patient is suffering.

Pain is due to pressure upon the nerve filaments ; it may be dull or aching, as when the muscles are affected ; sharp, as in inflammation of the serous membranes (pleura or peritoneum) ; burning, as in erysipelas ; shooting, as in neuralgia or meningitis ; boring, as in ulceration of the joints ; throbbing, as in felon.

It may be constant ; paroxysmal, as in the kidneys ; intermittent, as in neuralgia and syphilis.

The character of pain changes. In the early stages of an inflammation it is throbbing, and as pus forms the throbbing increases ; sometimes the tenderness may be greater than the actual pain, as in swelling of the mammary glands.

It may be acute, running a sharp course ; subacute, running a less sharp course ; or dull, running a slow, chronic course.

In injuries to the head, difference in expression may be noted in the sides of the face. Partial and temporary paralysis of the facial muscles may be due to cold, and is known as Bell's Paralysis. Lack of motion may herald paralysis.

Pulse.

Changes of the pulse as to frequency and compressibility are to be noted. In syncope, the patient is nearly pulseless. In heart failure, the pulse is soft and compressible. In brain compression, it is slow and hard. In uremia this same condition is present but is less apparent. In peritonitis, the pulse is small, thready, and weak, sometimes disappearing at the wrist and accompanied by a pinched, anxious expression.

Temperature.

The temperature should be regularly taken night and morning, or more frequently as the case may require. A sudden **fall** of temperature occurs in shock; sudden **rise** of temperature occurs in septicemia.

Respiration.

The rate, rhythm, and character of the respiratory movements should also be noted.

They may be easy or labored; slow or rapid; stridulous, as in croup; stertorous, as in cerebral affections.

In some cerebral affections, or at the close of Bright's Disease, a peculiar form of respiration often takes place, which is known as "Cheyne-Stokes" breathing. The respiration ceases altogether for a time, and then recommences, being at first rapid and shallow, then deeper and slower, after which it again ceases.

In pneumonia, the respirations are rapid, but the pulse-beat is not proportionately increased, as in nearly all other cases.

In peritonitis, the respirations are shallow and frequent, with no movement of the abdominal muscles.

In cases of dyspnea, or impending asphyxiation, the respirations become labored, the muscles of the face and neck horribly drawn, the nostrils dilated and flap-

ping, and the general appearance of the patient indicate intense suffering.

Cough is to be observed in old people particularly, Cough. and in patients after taking ether.

It may be a dry or hard cough, without expectoration ; a moist or soft cough, with expectoration.

Besides these characteristics it is necessary to note its frequency and severity ; whether it is worse or better at any one time during the twenty-four hours.

Observe the appearance of the sputa ; whether blood Sputa. be present after injuries to the chest, as fractured ribs, gunshot wounds, stabs, etc.

Position of patient is also to be observed. In Decubitus. some injuries to the head, where there is entire unconsciousness, the patient will remain in any position in which he is placed. In cases of cerebral irritation and tubercular meningitis of children, there is great restlessness, with increasing effort to bore the head into the pillow. In pneumonia, the patient lies upon the affected side, to allow the opposite lung to perform its function freely. In peritonitis, the knees are drawn up, and shoulders elevated, a position which tends to relax the abdominal muscles. In renal calculus, and cases of intestinal obstruction, the position is similar to that taken in peritonitis, only the patient endeavors to support himself by pressure upon the abdomen.

Secretions and excretions are to be noted, particularly when affecting the respiratory tract. The character of Secretions and excretions. the sputa of pneumonia, croup, diphtheria, and approaching hemorrhage should be carefully observed. The

sputum of pneumonia is of a reddish-brown, rusty hue.

Alimentary
canal.

Always note the character of the stools, especially after all operations. In intestinal obstruction, the necessity for an operation might be determined by the character of the stools.

In some cases, a "telescoping" of the intestines will occur, one part being pushed forward into the other; a careful watch must then be kept of the stools to see if any mucous membrane be passed. If bright red blood be present, the attention of the surgeon should be directed to it at once.

Urine.

The urine should be carefully observed after operations, and, if possible, prior to them. In all cases, note the quantity voided during twenty-four hours, and report the same to the surgeon.

If blood be present, report at once. In selecting a sample for examination, it is usually considered best to take all that has been passed during twenty-four hours, so that a general average may be had. If this is not practicable, save a night and morning specimen, as they may differ greatly.

Attitude.

Attitude or gait in walking may suggest the location of disease. In dropsy and abdominal abscess, the head and shoulders are thrown back. In spinal disease, the patient will endeavor to support himself by resting his hands upon his knees.

Patients may feign eccentricities of gait and posture, which may deceive the most skilled eye; constant watchfulness alone will assure the surgeon of his suspicions.

CHAPTER III.

ANTISEPTICS AND ANTISEPTIC SURGERY.

DEFINITION—PROCESS OF HEALING—MICRO-ORGANISMS—SEPTIC INTOXICATION—AIM OF ANTISEPTIC SURGERY—ANTISEPTICS IN COMMON USE—PREPARATION OF OPERATING ROOM—PREPARATION OF PATIENT—DIET—CLOTHING—TOWELS—IRRIGATION—INSTRUMENTS—SPONGES—LIGATURES—DRAINAGE TUBE—SUTURES—PROTECTIVE—DRESSING.

Whenever dead organic matter is exposed to the air Definition. it undergoes decomposition or putrefaction, attended with the development of disagreeable odors and the evolution of gases, such as ammonia and hydrogen sulphid. Putrefaction or *sepsis* is now known to be caused by the presence and activity of micro-organisms. In the putrefaction of organic matter poisonous bodies, termed ptomains, are also produced.

Asepsis is a condition in which there is a complete absence of all septic material and pathogenic organisms, hence a condition the reverse of putrefaction.

Aseptic surgery includes the use of all methods, such as heat and chemical agents, by which absolute cleanliness is obtained, both with reference to patient, instruments, room, etc. After an operation only such dressings are used as have been sterilized.

Antiseptic surgery includes the same methods, but in

addition employs during and after the operation chemical solutions and dressings impregnated with them, for the purpose of preventing the access of micro-organisms to the wound.

The process
of healing.

In the healing of wounds several different stages are observed varying with the nature of the wound, with which nurses should be acquainted. All wounds are repaired by an exudation of lymph from the blood-vessels, which glues the parts together, becomes vascular and organized, and develops into fibrous tissue.

First inten-
tion.

When the surfaces of a recent wound are brought together and placed in perfect apposition, and no foreign body permitted to injure them, they soon become glued together, the healing process at once begins, and in a short time the line of separation is hardly visible. A union of this kind is known as *union by first intention*. Usually the amount of lymph is small.

Second in-
tention.

When the injury is much greater and attended by a loss of tissue, the process of healing is practically the same. After hemorrhage has ceased, the blood coagulates, lymph and leucocytes are poured out, the blood-vessels dilate and grow into the exudation. From all sides of the wound spring up small red vascular points which constitute granulation tissue. This, as it increases, gradually restores the parts to a practically normal condition. There is no inflammation or suppuration. This is known as *union by second intention*.

Third inten-
tion.

When two surfaces of a granulating wound are perfectly clean and are brought into perfect apposition, the granulations fuse together, the blood-vessels pass from

one side to the other, and union soon takes place. This is known as *union by third intention*.

The process of healing of any wound may be, and is, frequently interfered with, by the entrance of low forms of vegetable life, which, from their minute size, are known as micro-organisms or bacteria. Micro-organisms.

It is the presence and destructive influence of these organisms in wounds which give rise to inflammation, the formation of pus, and certain poisonous conditions of the blood. Notwithstanding the large number of micro-organisms, they can be classified according to their form into four groups, viz. :—

1. The *Micrococci* include all those organisms which are spherical or slightly oval in shape. Of all micro-organisms the micrococci are the smallest.

2. The *Microbacteria* include those organisms which are cylindrical in shape, with rounded edges, or which are oval and elongated.

3. The *Bacilli* include all those organisms which are rod-shaped, with square cut ends. There is much variation in their size and length.

4. The *Spirilla* include those organisms which are filamentous and spiral in shape.

Nearly all forms of bacteria increase by simple division, a process which takes place with extreme rapidity. Some of the bacilli propagate themselves by the formation of spores or seeds which transmit the properties of the parent organism.

Micro-organisms are divided into two classes, viz. : pathogenic and non-pathogenic. The pathogenic are

those which cause specific diseases, such as the bacillus of tetanus, of diphtheria, of typhoid fever, etc. The non-pathogenic are those which, though causing decomposition, are practically harmless to the body.

Healthy tissues possess the power of resisting the destructive influence of nearly all bacteria. As soon as any tissue or fluid has its vitality impaired, it affords a suitable nidus for their growth and development. Hence after an operation in which tissues have been injured, inflammation and pus may form, followed by severe constitutional symptoms. The recognition of this fact has given rise to antiseptic and aseptic surgical methods.

Septic
intoxication.

Septic intoxication is caused by the absorption of septic micro-organisms and their ptomains into the blood, rendering it putrid and highly dangerous. The symptoms which follow septic intoxication are chills, rise in temperature, nausea, vomiting, followed by collapse and death.

Suppuration or decomposition in a wound is generally caused by the presence of certain micrococci which effect the decomposition and solution of the solids and fluids of the affected parts. Pyemia is also caused by the entrance of these micro-organisms into the blood and is the most intense form of blood poisoning. It is distinguished from septicemia in that it is attended by the formation of secondary abscesses.

Antiseptics.

The aim of antiseptic surgery is to place a barrier between the wound and these micro-organisms. This is accomplished by the use of one or more of the various

antiseptic agents, the most powerful among them being bichlorid of mercury, otherwise known as corrosive sublimate; next in order is carbolic acid. Iodoform, boric acid, aristol, salicylic acid are called accessories. Red iodid of mercury is sometimes used in place of bichlorid, the latter being so powerful that a solution of 1-3000 is considered strong enough to destroy all germs; in actual practice, 1-1000 or 1-2000 are the solutions generally used for wound irrigation, a weak solution 1-4000 or 1-5000 for the brain or eye.

There are many convenient ways of preparing the Bichlorid of mercury. Tablets containing $7\frac{3}{10}$ gr. may be obtained; one tablet dissolved in one pint of distilled water will make a solution of 1-1000. There is also another solution of bichlorid in alcohol, made by adding 3j of bichlorid to one quart of alcohol, which makes a solution of 1-300. That most frequently used is the standard solution (gr. xvij to the ounce), one drachm of which in one pint of water makes a solution of the strength of 1-1000.

Corrosive sublimate is extremely irritating and must be used with the greatest care. When used for washing out large cavities, a weak solution, 1-8000 or 1-12,000, should be employed.

In the early days of antiseptic surgery, carbolic acid was used entirely, the steam spray being kept in constant play during the operation. It is a highly volatile substance, easily inhaled, and sometimes causes intoxication. It is also very destructive to the skin. A 3 per cent. solution is generally used.

Peroxid of hydrogen.

Peroxid of hydrogen is another agent which is coming into very general use. It is sometimes fancifully called "bottled sunshine." To obtain its full effect, it should be used before bichlorid. In washing out a cavity plenty of time should be allowed for the first syringeful to come out before injecting another. Unless there is a sufficiently large opening, it will cause intense pain, on account of the distention which takes place in the wound.

It can be purchased in bottles varying in quantity from four ounces to one pound. It should be kept well corked, in an upright position, in a cool place. It is claimed to be non-poisonous, but produces a burning sensation in some cases.

Boro-salicylic.

Boro-Salicylic is highly recommended by a German physician, named Tersch, and is composed of two parts salicylic acid, 12 parts boric acid, and 1000 parts of water.

Boric acid.

Boric acid is a solution which is considered perfectly harmless, and can be used on the most delicate membranes without causing any irritation.

Boric acid gr. xv to one ounce of boiling water makes a saturated solution ; gr. x to the ounce is often used also.

Iodoform.

Iodoform is a substance easily remembered by its odor, and has been extensively used in antiseptic work, although aristol or pulverized boric acid is now used for the same purpose by many surgeons. It has also been given internally for some diseases, although attended by more or less risk, when used in large

quantities. Used freely upon a wound, it will sometimes cause considerable irritation, accompanied by a rise in temperature. Dusted over the surface of a wound, after the edges have been brought together, either alone, or in connection with boric acid or bismuth, it acts as a protective, and forms a coating which absorbs the discharge. A one per cent. solution of iodoform in glycerin is frequently injected in deep sinuses.

The solution of iodoform or tinct. benzoin comp. in collodion, applied over slight wounds by means of a bit of gauze or antiseptic cotton, where it is desirable to keep up the antiseptic treatment, forms a very neat dressing, the benzoinated collodion being a little more flexible.

The operating room should be thoroughly cleaned, and, if possible, disinfected. It should contain, in addition to the operating and instrument tables, the following:—

Irrigator.

Extra blankets and mackintosh.

Plenty of towels for use about the patient and surgeon's hands.

Hot and cold solutions.

Boiling water, if possible.

Extra night clothes.

Basins, large and small.

Bucket.

Bandages, adhesive plaster.

Oil and vaselin.

Syringe, oil-silk, scissors.

Lint, absorbent cotton, pins, safety-pins.

Drainage tube, ligatures, sponges.

Brandy, ammonia, hypodermic syringe.

The temperature of the room should be from 68° to 70° Fahr.

The operating table should have a folded blanket laid lengthwise upon it, and one firm pillow protected by a mackintosh pillow case. A mackintosh, or operating pad, should be arranged in such a way as to protect the patient, and also to drain the water used in irrigation into a waste pan or bucket. Bandages, splints, and dressings should be conveniently at hand, and ready to apply the moment the surgeon requires them.

The duties of the nurse in an operating room vary, according to circumstances and the surgeon. She may sometimes be required to hand the instruments, and for this reason should know all those in ordinary use, and where to find them; again, she may be obliged to administer the anesthetic, either chloroform or ether; or she may simply be required to attend to the sponges and ligatures.

There should be at least two basins for sponges, one containing plain cold water for washing out blood, and the other *warm* solution or distilled water, from which the sponges are to be handed. Great care should be taken to have them squeezed as dry as possible, otherwise the wound becomes filled with water. They should also be counted, especially in all abdominal work. Whatever her duties may be, the nurse must

watch attentively and be ready to do anything which may be required.

Before the dressing is applied, the soiled towels should be deftly withdrawn and their place supplied by clean ones. It is a good plan to have no more about than is absolutely necessary, so as to give the surgeon plenty of room. By exercising a little thought and care, this can usually be accomplished, and will be found a great help in facilitating proceedings.

An extra nurse should always be present to attend the patient, never leaving him alone until he has completely recovered from the effects of the anesthetic.

There is always more or less danger attending even a slight operation, and every one in any way connected with it should be extremely careful.

Preparation
of patient.

Whenever it is possible, the patient should be prepared some hours before the operation is to be performed. Usually a purgative is given the evening previous, followed by a simple enema in the morning; this should be given early, in order to allow the bowels sufficient time to be thoroughly moved. The patient should then be bathed, the region of the operation especially being thoroughly scrubbed.

No matter how careful and cleanly the person may be, there is always more or less excretion from the skin. In some people the secretions from the cheesy or fat glands is far greater than in others; again, the mouths of these glands are larger in some cases than in others. After the skin has been carefully washed, the part should be carefully but thoroughly shaved, then washed

with Castile soap and a nail brush. This should be followed by the use of turpentine, alcohol, and, lastly, the bichlorid solution, 1-1000. A temporary dressing wet with bichlorid, 1-2000, is then applied.

In preparing a patient for abdominal section, most surgeons require special attention to be given to the navel, which is usually packed with iodoform or some one of the antiseptic powders.

Diet previous to taking anesthetic.

If the patient is to take an anesthetic, no food should be given for from four to six hours previous to the operation, and then only milk or some very light article of diet.

Clothing.

The patient should be lightly clad. With some surgeons it is customary to use a flannel garment in abdominal sections. The clothing should be arranged for the convenience of the operator, and protected, as far as possible, from the discharge or hemorrhage, by the arrangement of the mackintosh or operating pad. The band about the neck should be loosened.

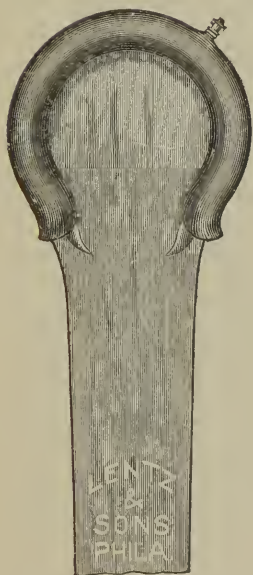
At the time of an operation the nurse must be careful to make her hands thoroughly aseptic by thorough washing and the use of a nail brush; and, if more elaborate proceedings are not gone through with, at least the entire hand should be dipped for fully one minute in a bichlorid solution of 1-1000.

Towels.

Everything being in readiness, the patient should be placed upon the table in a position convenient to the operator, with mackintosh arranged, and the operating field protected by antiseptic towels, preferably dry ones, which have either been sterilized or previously wrung

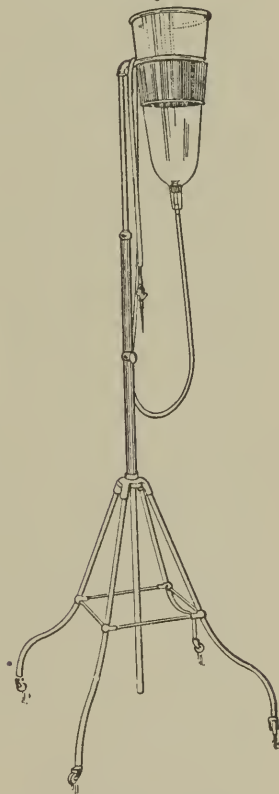
out of bichlorid solution 1-2000 and dried. If used

FIG. 2.



Operating Pad.

FIG. 3.



Irrigating Stand.

wet, they should be wrung out of warm bichlorid solution 1-2000.

Irrigation. Some operators prefer to have a constant, gentle stream play over the operating field, and when this is done the solution should be warm, as it is dangerous to deluge a large surface or a deep cavity with a cold solution, on account of its depressing influence.

Instruments. The instruments having been previously chosen by the surgeon, and sterilized, should be placed in the trays and entirely covered either with three per cent. solution carbolic acid or hot distilled water. Many surgeons prefer the latter, as it is less irritating to the hands. It is always best to have an extra tray with hot water, in which the soiled instruments may be rinsed before being placed among the others.

Sponges. As soon as the surgeon begins to use the instruments the nurse should be ready to hand a warm, dry sponge. It is more convenient to have several in the hand at once, held in an antiseptic towel; thus a fresh one can be handed at the same time the soiled one is removed.

Ligatures. Ligatures will next be needed. These may be of catgut or Chinese silk, and should be cut about eighteen inches (18 in.) long. Always have two ready to hand, as the first one may break. Always test it before handing it to the surgeon.

With most operators a small ligature is preferred, as the smaller the ligature the smaller the knot.

In tying, the vessel undergoes a process of healing; the ligature comes to an end, a clot forms, and the vessel becomes a fibrous cord.

**Drainage
tube.**

As it seems impossible to prevent germs from entering a wound, they must be gotten rid of in some way

or other. This is accomplished by the use of drainage tubes. These may be made of perforated rubber, which comes in three different sizes, or of glass. The latter are generally used in abdominal cases, and can be obtained in different sizes, either bent or straight.

Sometimes drainage is provided for by stitching a few strands of catgut or horsehair into the wound. This is usually done in scalp wounds. Where the rubber tubing is used, the ends are secured by a safety-pin, previously dipped in an antiseptic solution.

When all is ready, the edges of the wound are brought together by means of sutures. These may be of silver wire, catgut, silk, or silkworm gut. Ascertain, if possible, which is to be used, so that the needles may be threaded and ready to hand. Always give about three-quarters of a yard in length.

After the wound has been washed, stitched, and the edges nicely approximated, the line of suture is usually dusted with some of the antiseptic powders, iodoform, aristol, or boric acid, and protectives applied, followed by the dressing, which usually consists of sterilized, or bichlorid, gauze. The dressing should be prepared sufficiently large to extend from two to four inches beyond the wound in every direction, and should consist of from 16 to 20 layers, separated into a deep and superficial dressing; the former about three inches smaller than the latter. Some surgeons prefer to use a rubber film between the last layers of gauze in the superficial dressing when it is desired to keep the wound moist. If you have no film, parchment or wax paper

may be used in its place, always being careful to dip it in solution before inserting it between the gauze.

Bandage. The bandage may be either of gauze or the ordinary muslin roller, as the case may demand. The gauze bandage applies itself more readily to the part. Sometimes in a stump operation the dressing is confined by an adhesive strap.

CHAPTER IV.

ANTISEPTIC DRESSINGS.

PREPARATION OF GAUZE—BICHLORID—BORATED—PLAIN IODOFORM—EVAPORATING DRESSINGS—SPONGES—LIGATURES AND SUTURES—PROTECTIVE—INSTRUMENTS.

Keeping before the mind the aim of antiseptic surgery, which is to prevent putrefaction, it will readily be seen that it is not sufficient to render the wound thoroughly aseptic at the time of operation or injury, but these precautions must be kept up so long as the wound requires a dressing; hence, all the articles used must be specially prepared.

In order to prevent the air from striking the wound, and also to catch any discharge coming from the same, dressings of gauze are generally used. This is simply cheese-cloth which has been previously prepared by boiling for one hour in water sufficient to cover it, to which has been added two pounds of washing soda or strong lye. It is then wrung out, rinsed and placed in bichlorid solution, 1-2000, for 12 hours; after which it is again wrung out, folded into suitable length and width, rolled while still moist, and securely wrapped in oil paper.

Borated gauze is prepared in the same manner, except that a solution of boric acid is used in place of bichlorid.

Plain.

Plain sterilized gauze is often used, especially in abdominal work. Manufacturers usually fold the gauze in one yard lengths.

Iodoform
and iodo-
formed.

Iodoform and **iodoformed gauze** are two different things. The latter is made by sprinkling the material thoroughly with powdered iodoform, while in the former the iodoform is rubbed into the meshes. This may be done by wringing the gauze out of alcohol and then rubbing the iodoform thoroughly into its texture; but a far better way is to prepare a solution of iodoform, alcohol, and glycerin, first breaking up the iodoform with a little distilled water; dip the gauze in this solution and then rub it thoroughly into the meshes. It will be found more convenient to cut the gauze into five-yard lengths, folding it lengthwise, three times, which will make it about $4\frac{1}{2}$ inches in width; this can be easily managed. Wring it as dry as possible, and either fold or roll it, keeping it in a glass jar. In preparing iodoform gauze, it is best to use plain sterilized gauze; for if bichlorid gauze be used, after keeping it for any length of time, the red iodid of mercury is precipitated.

Emergency
dressing.

In case of an emergency, where an antiseptic dressing is required, and no gauze is at hand, absorbent cotton may be used, first baking it for a few minutes in an oven, then wet it with bichlorid solution, then dry and keep in cheese-cloth bags.

Alcohol
or evapor-
ating dress-
ing.

Alcohol or evaporating dressings are frequently used where there is a tendency toward inflammation. In this case lint is generally preferred, wrung out of

equal parts of alcohol and distilled water ; or, if a more soothing dressing is required, equal parts of alcohol, distilled water, and witch hazel. The dressings are kept moist by means of wax paper, and are changed several times during the day, and are very grateful to the patient.

In all operations sponges will be used. These may Sponges. be either of gauze or the regular sea sponge.

If gauze be preferred, the nicer way is to take oblong Gauze. pieces of the material, and fold them to the required size, turning all the edges on the inside, slipping the last edge into the opposite fold (as you would slip the flap of the envelop into the envelop), thus holding it in place. A little experience in doing this will enable you to make a very neat sponge of sufficient thickness to answer all purposes. A simpler way is to fold the gauze the desired width, and cut it into squares, but in this way the layers of gauze separate. Gauze sponges are now used entirely by many surgeons. They can be readily sterilized and are inexpensive, one yard making from twelve to fifteen, according to the size.

Of the sea sponge, the fine surgeon's sponge, com- Sea sponges. ing in strings of about fifty, are to be preferred, and may be prepared in any of the following ways :—

All sponges have a certain amount of sand in them, Mode of preparing sponges. which must be removed by beating them between coarse material of any kind (a canvas bag is best) with a wooden implement in order to avoid cutting the sponge.

After the sand has been removed, the sponge should

be rinsed and placed in diluted muriatic acid for fifteen minutes; then washed in cold water, then in warm water with green soap; then rinsed thoroughly, and placed in five per cent. or 1-20 carbolic solution.

Another mode of treatment is first to beat the sponges, then soak them in warm water twenty-four hours, then in Condyl's fluid f3j, to gall. j of water for another 24 hours, after which they should be washed thoroughly in warm water and placed in sulphuret of sodium f3j, hydrochloric acid f3j, and water gall. j, for one minute; they should then be removed, washed thoroughly, and placed in five per cent. carbolic solution.

A simpler, and, in my experience, a far better method than either of the preceding, is to beat the sponges well in a canvas bag, to remove sand; then immerse them in a solution of muriatic acid f3j to Oj of distilled water for three hours, to remove remainder of sand; then kept for eight hours in hot running water, then immersed in bichlorid 1-1000 for ten hours, then rinsed and preserved in five per cent. carbolic solution.

Bleaching. To bleach sponges, soak for one hour in five per cent. solution of permanganate of potassium; afterward wash them in pure water, then in a saturated solution of oxalic acid; rinse thoroughly and keep in a carbolic solution.

Ligatures and sutures. Ligatures are composed of animal tissue. The catgut, ranging in size from 0 to 4, is generally used. It may be chromicized or non-chromicized; the latter is called "Kocher Gut." It is thoroughly antiseptic and flexible when properly prepared, and does not last

longer than the tissues allow, which is from one to five days. To prepare the gut, first wash it in alcohol, then place it in the oil of juniper-berry for 24 hours, after which keep it in alcohol ready for use. When it is desired to have the gut last longer, as in sutures, and the ligation of large arteries, place the non-chromicized gut first in alcohol, then in five per cent. carbolic sol. to which has been added gr. xxx of bichromate of potass., where it should be kept 48 hours or longer, as the surgeon may direct, after which it is preserved in alcohol. This gut will last from 14 to 21 days.

Another method formulated by the late Prof. S. W. Gross, M. D., of Jefferson College, is as follows: "Raw catgut should be placed for half an hour in 1 per cent. alcoholic solution of corrosive sublimate, to which has been added five per cent. of tartaric acid. It should then be placed on a cloth wrung out of 1-1000 watery sublimate solution, until it has dried. It is then transferred to, and kept permanently in, oil of juniper-berry, but should not be used prior to the expiration of ten days. When it is desired to employ the gut, it is cut into suitable lengths, and wiped with a towel which has been soaked in a 1-1000 watery solution of corrosive sublimate. It is then placed for half an hour in a 1-1000 watery solution of sublimate, to which has been added one-fifth its weight of alcohol, the latter agent preventing the gut untwisting and preserving its rotundity. Prepared in this way, catgut is absolutely aseptic."

Silk ligatures and sutures are also used, and may be Silk.

had in surgeon's silk, twisted Chinese, or the iron dyed silk; the latter is not so well suited for deep ligations, the majority of surgeons preferring the twisted Chinese. Whichever variety is chosen, it must be first boiled in distilled water for one hour, then placed in five per cent. carbolic solution for 24 hours, after which it should be kept in alcohol ready for use. Another way, somewhat quicker, is to boil for one hour in five per cent. carbolic solution, then keep in alcohol. It is more convenient to have it wound on glass spools.

FIG. 4.



Glass Drainage tube.

FIG. 5.



Rubber Drainage Tube.

Silk worm
gut.

Silk-worm gut has simply to be thrown in carbolic solution a few minutes before using, or kept in alcohol.

Protective
agent.

The protective agent consists of oil silk, which has been subjected to a coating of copal varnish, and then thoroughly brushed over with a mixture of dextrin, to which has been added two parts of powdered starch and 16 parts of five per cent. carbolic solution. It is used to prevent the air from entering the wound, and also to prevent the dressing from becoming adherent.

Drainage tubes, either of rubber or glass, should be kept in five per cent. carbolic solution. Drainage tubes.

All instruments should be thoroughly sterilized, before and after using, and should never be placed in bichlorid solution, as it dulls the edge and discolours the steel. In preparing the various articles, great care must be taken to have the hands thoroughly aseptic, as well as all the utensils used. For wherever antiseptic treatment is desired, it must be carefully carried out, even to the most minute detail; and as this is largely left to the nurse, who is frequently held responsible if any mishap befall the patient, she can scarcely be too careful. Instruments.

CHAPTER V.

GYNECOLOGICAL NURSING.

DEFINITION—POSITION OF PATIENT—PREPARATION FOR EXAMINATION—INSTRUMENTS USED—CATHETER—CARE OF PATIENT AFTER OPERATION.

Definition. Gynecology, in medical language, comprehends the study and treatment of the diseases peculiar to women.

Position of patient. In all work of this character, it becomes necessary to place the patient in one of several positions, in order that the work may be easily and quickly accomplished.

The general plan is to bring the patient well over to the edge of the table, the buttocks overhanging the same, with the thighs well flexed upon the abdomen, thus bringing the parts into good anatomical relation, and within ready access of the surgeon's finger. In some cases the buttocks are elevated. It is often necessary to examine the patient without removing the clothing, which should then be put entirely out of the way, all constricting bands loosened, in order to facilitate the investigation and to enable the surgeon to make a thorough examination.

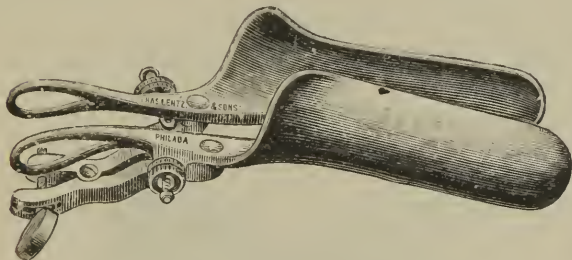
Sims'. In **Sims'** position, the patient is placed upon either side, preferably upon the left, the buttocks being brought well over the side of the table, with knees well

flexed upon the abdomen. This position requires assistance.

In using vaginal injections and in replacing the uterus, ^{Knee chest.} the **Knee-chest** position is adopted. The patient kneels down upon the bed or table, having a pillow placed under the chest, which permits the contents of the abdomen to fall away, so that when the vagina is opened, air distends all the parts.

Before beginning an examination, place a piece of ^{Preparation for examination.}

FIG. 6.



Goodell's.

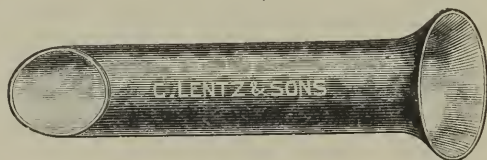
mackintosh beneath the buttock, to protect the clothing and bed, and **entirely** cover the patient.

Oil of some kind, or, better still, carbolized cosmolin 1-40, should be in readiness for the surgeon to anoint the finger. If a stronger preparation than 1-40 be used, it is apt to cause inflammation. When the surgeon is ready hand him the oil, then the speculum, also oiled.

There are various kinds of specula, of which ^{Goodell's speculum.}

Goodell's bivalve is now considered the best. In handling the instrument always be sure that the set screws are set far away from the handle, to secure the proper adjustment of the blades.

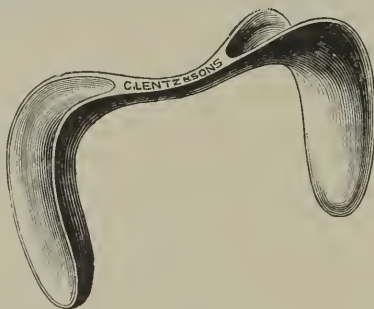
FIG. 7.



Fergusson's.

Fergusson's. Fergusson's speculum is an old-fashioned instrument, now seldom used. It is usually made of hard rubber, but is also made of glass.

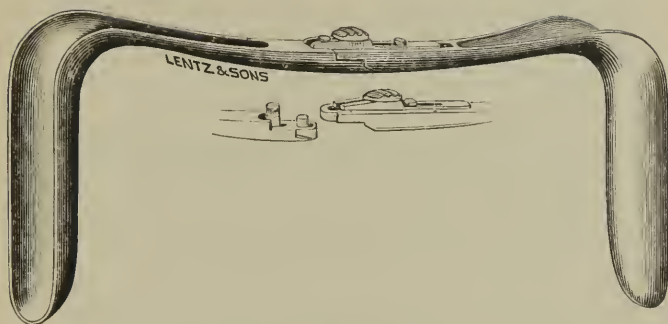
FIG. 8.



Sims'.

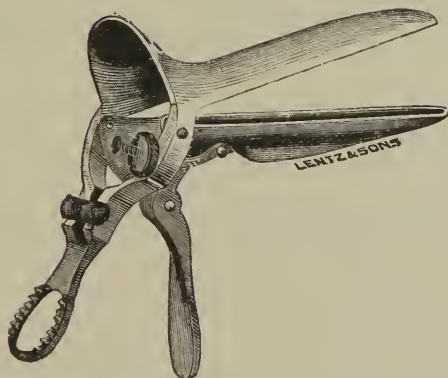
Sims'. Sims' speculum has two blades upon one handle, one larger than the other.

FIG. 9.



Robb's Modification.

FIG. 10.



Cusco's.

Cusco's.

Cusco's speculum is also a bivalve, one side being roughened into a collar. It is limited in its utility, and is now seldom used.

FIG. 11.



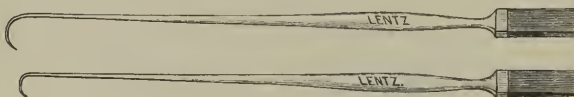
Speculum Forceps.

Speculum
forceps.

The speculum being inserted, speculum forceps will next be used. These are long, slender instruments, used for removing tampons, or for cleansing purposes.

FIG. 12.

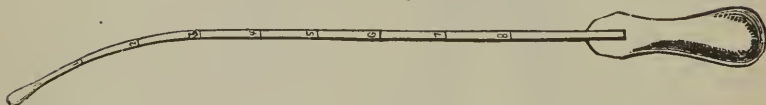
Tenaculum.



Tenacula.

Care must be taken to catch the cotton lightly, but firmly, in order to avoid forcing the springs apart.

FIG. 13.



Sound.

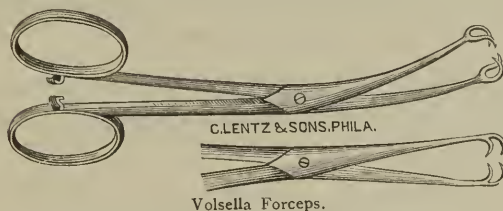
Sound.

Uterine hooks, or tenacula, are often necessary. The uterine sound is simply a long-handled sound,

with a shoulder two inches in length, made of flexible copper-plated wire. It is sometimes used without the speculum.

The applicator consists of a piece of aluminum wire Applicator. mounted in a long handle, roughened at the end, to admit of the cotton becoming firmly attached. In wrapping cotton upon the instrument, care must be taken to do it very neatly, making it about as thick as the end of the probe; and be sure that the same is securely held upon the instrument, so that there is no danger of its being left in the cavity.

FIG. 14.



Volsella Forceps.

The surgeon will indicate the solution to be used, and will prefer to apply the same himself. Tr. iodin, pure carbolic acid, nitrate of silver, and, sometimes, tannic acid cut with glycerin, are the solutions generally used.

Cervix forceps are long-handled toothed forceps, with Cervix forceps. a small hook, which allows the tissues to be firmly held, and should always be handled carefully.

Volsella forceps are long-handled instruments, used Volsella forceps. in lacerated cervix.

Curettes consist of a hoop or spoon, with a long Curettes.

handle. They are of various sizes, both blunt' and sharp.

Cervix
scissors.

Cervix scissors are long-handled curved scissors, and

FIG. 15.



Sharp Curette.

should never be used for any other purpose than that for which they are designed.

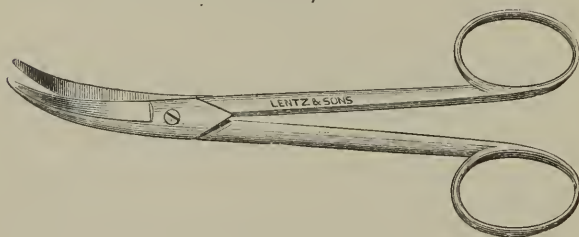
FIG. 16.



Blunt Curette.

There are also double-curved, angular, and straight scissors. The latter are known as "Kuechenmeister's,"

FIG. 17.



Cervix Scissors.

having a point at the end, and are preferred by some surgeons.

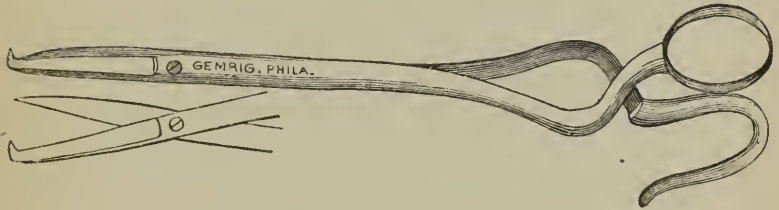
Tampons.

In making applications to the mouth of the vagina,

tampons made of cotton, wool, lint, and, in case of emergency, even old cloth, are used.

They must be neither too large nor too small, but just right, and may be medicated as the surgeon directs. A

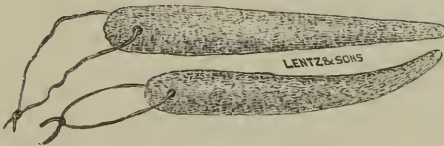
FIG. 18.



Kuechenmeister's Cervix Scissors.

very convenient form for use in private practice, is the gelatin capsule, filled with Globe antiseptic wool. Before inserting the latter, it is necessary to moisten it a little.

FIG. 19.



Sponge Tents.

Sponge tents are made of a variety of substances and are used to dilate the os and cervix uteri.

Vaginal suppositories do not differ from rectal suppositories, except they are larger.

The use of the catheter, when once thoroughly un-

Sponge tents.

Suppositories.

Catheter.

derstood, is not a difficult matter, and should occasion very little discomfort to the patient.

Every nurse should be able to catheterize by touch. In order to do this, the index finger of the left hand, well-oiled, is inserted into the vagina and brought forward in the median line, against its anterior wall. The urethra will be then separated but by a thin partition. The catheter, held in the right hand, is then slipped forward over the finger until it reaches the situation of the urethral orifice, when it will, with a little practice, pass readily into the bladder. The catheter should be inserted for the distance of one and a half inches. When the catheter is withdrawn, care should be taken to close the outer orifice with the index finger, so as to prevent the escape of the urine yet remaining in the catheter, and so soiling the clothing or interfering with the process of healing after an operation relating to any neighboring parts.

This precaution is especially necessary after the operation for repairing a lacerated perineum, as the dropping of urine upon the parts may excite inflammation and suppuration, and thus render all the surgeon's work worthless.

The French or olive-pointed catheter is firmer than the Nélaton or soft rubber, and is preferred by some surgeons.

The Nélaton, a soft, flexible catheter, is perfectly safe, and gives very little discomfort to the patient. Numbers 17 to 20 are the sizes generally used. Of the English catheters, Number 8 is to be preferred ; before

insertion it should be slightly warmed in the hand, or by dipping in warm water. Boiling, or even very hot water should never be used in cleansing the soft cathe-

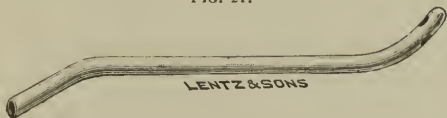
FIG. 20.



Silver-plated Catheter.

ters. Catheters are also made of glass and of silver, and in the hands of a skillful nurse, are highly recommended.

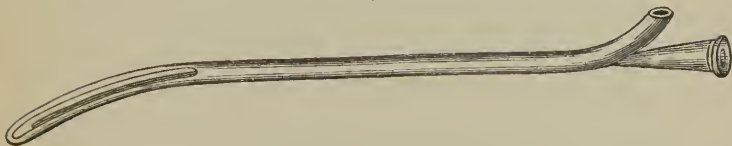
FIG. 21.



Glass Catheter.

The bladder, situated behind the pubic bone, is a highly sensitive and vital organ, and is emptied by the urethra, which is a tube $1\frac{1}{2}$ inches in length, extending

FIG. 22.



Double Current Catheter.

from the external orifice in the vaginal wall, upward and backward, nearly in line with the same.

All instruments used in connection with these organs

should be warm and scrupulously clean. Each time after using the catheter it should be carefully cleansed, and well syringed either with bichlorid 1-8000 or carbolic solution 1-40, special attention being paid to the eye of the instrument. They are best kept, when in use, in a solution of boric acid.

Care of
patient after
operation.

After all gynecological operations the patient should be kept perfectly quiet. She may lie in any position in which she is placed, but should not be allowed to move herself. An easy way to change the position from one side to the other is to gently lift the mattress at one side, when she will find her position changed without having been occasioned the least discomfort.

After all operations of this nature patients are more or less subject to "hysteria," which must be dealt with as in other cases. They will often fancy they are going to have peritonitis, if there be any pain in the abdomen, or perhaps because one of her parents or friends died with this disease. Such fancies need occasion no alarm, and it becomes the duty and privilege of the nurse, as at all other times, to endeavor to encourage and reassure her, leading her mind back to brighter and happier thoughts.

CHAPTER VI.

GYNECOLOGICAL NURSING (Concluded).

INJECTIONS—TEMPERATURE—TIME OF GIVING—QUANTITY—
POSITION AND CARE OF PATIENT—MEDICATED SUBSTANCES
USED—TABLE—VENEREAL DISEASE—ABRASION OF THE
SKIN.

In all gynecological work injections will form a large Injections.
part of the treatment. The simplest form of injection is hot water, which often forms the sole treatment. Before giving an injection of any kind always ascertain the exact temperature desired, testing the same by the use of a thermometer.

A warm injection should be given at about the temperature of the body, or a little higher, say 100° to 101° Temperature.
F. It may be used at a temperature of 110° , but never higher, without specific directions from the surgeon.

Water, while running through the tube, becomes cooled, and should always be maintained at the indicated temperature. All injections are best given upon going to bed, unless ordered twice a day. In cases of inflammation the condition rapidly improves under this treatment.

The usual quantity given is about one gallon, preferably by the use of the Fountain syringe, hung just high enough to insure a continuous flow. Quantity
and syringe. The Davidson

syringe is also used, but with it the same evenness of flow cannot be obtained. The nozzle of the syringe is of importance ; the regular vaginal nozzle, having perforations at the side, is to be preferred.

Position of
patient.

The position of the patient is of great importance.

When taking an injection herself, the patient is apt to place herself in a sitting posture, rendering the treatment practically useless, as it is impossible to reach the entire surface in this position.

The better way is to place the patient upon her back, with hips slightly elevated. In a normal condition, the surface of the canals of the body are in contact with each other, so if you wish to medicate the entire surface, this position must be adopted.

Care of
patient.

Before giving an injection of any kind, a mackintosh or operating pad should be placed beneath the patient to protect the bed and clothing.

Keep the patient well covered, especially while giving a hot injection, as exposure to cold at such a time might undo all the good for which the treatment was designed. The water should be permitted to run slowly and evenly.

Substances
used for
medicated
injections.

The substances used for medicated injections may be divided into two classes: **Antiseptics** and **Astringents**.

The *Antiseptics* being *Bichlorid of Mercury*, *Carbolized Lotions*, and *Boric Acid*. The *Astringents* being divided into *Mineral*, embracing *Sulphate of Zinc*, *Acetate of Lead*, and *Alum*; and into *Vegetable*, embracing *Tannin* and *White Oak Bark*.

Permanganate of potassium deodorizes, but is not highly recommended on account of its staining properties.

Except when using bichlorid or carbolic solution, it is best to make the desired solution at the time of using.

The surgeon will in all cases give directions as to the strength of the solution to be used. Bichlorid is usually preferred in solution 1-8000. It has been found from experience that even used in strength 1-1200 or 1-2000, causes some pain. Carbolic acid is seldom used; when it is employed, the strength of solution is generally 1-100. The following will be found a convenient table for making the several solutions:—

One heaping teaspoonful* of

Alum,	2 drachms
Sulphate of Zinc,	2 drachms
Acetate of Lead,	1 ½ drachms
Tannin,	½ drachm
Crystallized Boric Acid,	100 grs.
Pulv. Boric Acid,	about 90 grs.

The crystallized boric acid is best for general use, the pulverized being more slow to dissolve. The crystals dissolve more easily in warm water. With the exception of tannin, dissolve the above in one pint of water, which will make the solution of proper strength. With tannin, use one tablespoonful to the pint.

Nitrate of silver is also objectionable on account of its staining properties, but is too valuable a remedy to

* Lecture delivered by Dr. Neilson.

be discarded, especially in some cases of gonorrhea. Of course a weak solution is used, gr. j to fʒvj of water, making a solution of 1-2500.

It becomes decomposed by the action of light and should be kept in a dark bottle, away from the direct rays of the sun. If the solution be spilled, cover the spot with common salt.

Venereal
disease.

In gynecological work, both the surgeon and nurse often meet with cases of unsuspected **Syphilis** and other venereal diseases, which, while extremely loathsome, are usually interesting to the surgeon, as they readily answer to treatment.

The virus of syphilis is highly contagious. Any abrasion of the skin may carry the poison, and great care must therefore be taken to avoid contact with the secretions, thoroughly protecting any scratches or cuts you may have upon your own hands, before going to the patient. If you should be so unfortunate as to become inoculated, soak the hands at once in bichlorid; apply nitrate of silver to the spot, and consult the surgeon.

Wherever it is possible, instruments used in these cases should not be used upon other patients. If this is impossible, they must be rendered thoroughly aseptic before they are again used.

The same care should be exercised in regard to any linen or articles of clothing used about the patient.

Where there are syphilitic outbreaks about the mouth, special dishes should be reserved for the use of the patient.

Gonorrhea consists of a purulent, contagious discharge from the urethra or vagina. Inoculation is easily affected by contact with the mucous membrane; thus, if after handling a patient suffering from this disease you should touch your eye or nose, those organs would easily become affected.

The same care is necessary in regard to all instruments and utensils used as in syphilitic cases.

Children of the poorer class, such as we meet with in hospitals, often suffer from inherited syphilis or tuberculosis.

Patients suffering from excoriation or abrasion of the skin, may be relieved by dusting the part with **Pulv.** Abrasion of the skin.
Boric Acid and Oxid of Zinc in equal proportion.

CHAPTER VII.

HEMORRHAGE.

CIRCULATION—BLOOD—SITUATION OF SOME OF THE ARTERIES—
DEFINITION—GENERAL SYMPTOMS—KINDS—WAYS OF AR-
RESTING—INSTRUMENTS USED.

Circulation. In order to understand the cause of hemorrhage, it is necessary to understand something of the circulation of the blood, which has been compared to a central pump with a distributing and collecting system,—the heart representing the pump, arteries and veins the distributing and collecting system.

The heart is a cone-shaped organ, situated nearly in the middle of the chest, with its apex, or small end, pointing downward, forward and to the left, and is anatomically divided into two organs.

The large veins from the head and lower extremities empty, by means of the superior and inferior venæ cavæ into a right chamber of the heart, called the right auricle, from its resemblance to an ear; from the right auricle it passes through the auriculo-ventricular orifice, guarded by the tricuspid valve, into the right ventricle, and then passes through the pulmonary artery, to the lungs, where it is purified, and returns by means of the four pulmonary veins to the left auricle, passing through the auriculo-ventricular orifice, guarded by the mitral

valve, into the left ventricle ; thence through the aortic orifice, to the aorta, which distributes it through the body by means of smaller branches. These small arteries finally terminate in the capillaries, which after dividing and subdividing supply the different organs and tissues with blood. The capillaries unite to form the veins, which are all finally combined in the superior and inferior venæ cavæ. The left heart supplies arterial blood, which has received oxygen as it passed through the lungs.

When the blood comes from the system, it carries with it carbon dioxid gas, and is purple or bluish in color. As it passes through the lungs, it gives off the carbon dioxid and takes on oxygen, and becomes red in color.

Blood is composed of both liquid and solid elements. The liquid is known as liquor sanguinis, or plasma, and consists of the nutritive principles of the food. The solid elements are the corpuscles, of which there are two kinds, red and white. The red corpuscles, as seen in the human body, are small circular bodies, flattened into thin plates or discs, and are the oxygen carriers. The white corpuscles, more globular in form, are transformed into red corpuscles, and are otherwise concerned in the nutritive processes of the body. An excess of white corpuscles in the blood produces a disease called leucocythemia.

Composition
of blood.

Life depends upon a thorough carrying out of all the functions of the body ; hence, if the blood becomes less in quantity, as the result of hemorrhage, or thinner and

paler, from a lack of red corpuscles, as in anemia, a loss of strength is felt. In health the breaking down of the blood corpuscles and loss of blood can be restored. In order to control hemorrhages the situation and relation of the principal arteries are necessary.

Situation of
brachial
artery.

The **Brachial Artery** passes obliquely down the inner side of the arm to the middle of the bend of the elbow.

Radial.

The **Radial Artery** passes along the outer side of the forearm, guarded by the muscles and tendons; it is easily felt at the wrist. To control hemorrhage, compression may be made at almost any point in the course of the brachial artery. If pressure be applied at the upper part of the artery, it should be from within outward; and if on the lower part, from before backward, as the artery lies on the inner side of the humerus above, and in front of it, below.

Ulnar.

The **Ulnar Artery** runs along the ulnar side of the forearm, becoming near the wrist more deep-seated than the radial, and ends in the palm of the hand by forming the superficial palmar arch. Bleeding from the palmar arch is always serious; pressure should be made at both sides of the wrist.

Subclavian.

The **Subclavian Artery** extends from its origin to the outer border of the first rib. To arrest hemorrhage from this artery, the shoulder should be depressed, grasping the side of the neck, press with the thumb or the handle of a long key in the hollow behind the clavicle, downward, against the rib. If for any reason the shoulder cannot be sufficiently depressed, pressure may be made from before backward.

The **Axillary Artery** runs from the outer border of ^{Axillary.} the first rib to the axilla. Compression of this artery is sometimes required, and can only be effectually accomplished in the lower part of its course by pressing upon it from within outward, against the humerus.

In arresting hemorrhage from the temporal artery, ^{Temporal.} pressure should be made in front of the ear.

The **Femoral Artery** extends from the center of ^{Femoral.} the groin, along the anterior and inner side of the thigh, to the junction of the middle with the lower third of the thigh, where it becomes the Popliteal Artery.

It is a large vessel, easily found, hemorrhage from which is always serious. Pressure should be made immediately below **Poupart's Ligament**.

The vessel may also be compressed in the middle of the thigh, by placing a compress over the artery, beneath the tourniquet, and directing the pressure from within outward, so as to compress the vessel against the inner side of the shaft of the femur.

At the ankle there are two vessels: the **Anterior** ^{Anterior and posterior tibial.} and **Posterior Tibial**. The *Anterior Tibial* lies deep in front, between the first and second tendons. A line drawn from the inner side of the head of the fibula, midway between the two malleoli, will mark the course of this artery.

The *Posterior Tibial* artery lies between the inner malleolus and the heel, ascending the tibial side of the leg to the popliteus muscle. Hemorrhage from these vessels can be controlled by digital pressure or by compress.

Definition. A sudden rush of blood which empties the system constitutes hemorrhage, and is dangerous to life.

General symptoms. The general symptoms of hemorrhage are pallor and an almost imperceptible pulse. As the hemorrhage continues, this pallor becomes extreme, rendering the skin almost like wax; the lips become thin and blue; nostrils pinched; pulse small and rapid; the respiration shallow; the thirst extreme. Not only the mouth, but all the mucous membrane of the body becomes parched. The same symptoms prevail whether the hemorrhage be internal or external.

Kinds. The nature of the bleeding can be easily distinguished, as blood coming from an artery issues in jets or spurts, and is bright red; while that from the veins, with the exception of the jugular and subclavian, gushes, or oozes in a more or less constant stream, and is darker in color. In old or asthmatic persons the arterial blood is slow to regain its color, and so is only distinguished by the character of the flow.

In deep-seated wounds, where the artery is more or less covered, the bright-red blood may be seen flowing over the edge of the wound in a little stream, and so is easily distinguished by its color. In the old and feeble, and in very young persons, a hemorrhage is dangerous, not only on account of the quantity of blood lost, but also in the effect upon the patient.

Nature's way of arresting hemorrhage. **Syncope**, or fainting, is nature's way of arresting hemorrhage. After a certain amount of blood has been lost, the vessels dilate and lower the pressure. In consequence the heart's action becomes depressed and sends

less blood to the brain, and, in consequence, fainting or unconsciousness results. In this case keep the patient quiet, with the head low, avoiding stimulants ; this condition of syncope favors the formation of a "blood-clot" in and around the artery.

When reaction takes place, there is danger of a recurrence of the hemorrhage. Means should therefore be taken to effect a permanent arrest of the hemorrhage. Death resulting from hemorrhage is perfectly painless.

Nature does not always perform her part, in which case it becomes necessary to employ surgical means. If brought face to face with a wounded vessel of the arm or leg, for example, from the signs already given, you could easily determine whether the bleeding was arterial or venous.

If arterial, press the bleeding point with the finger or thumb ; it is better to use both, and so support the opposite surface. If there be time, of course disinfect the same, but in case of emergency, stop for nothing. If not very violent, do not thrust the finger directly into the wound, but above or below the point of bleeding, according as it is arterial or venous.

In arterial hemorrhage from scalp wounds, place the finger below, nearer the heart, and at a short distance from the wound.

In venous hemorrhage from a superficial vein, place the finger below, in case of the extremities, and above, in case of the head.

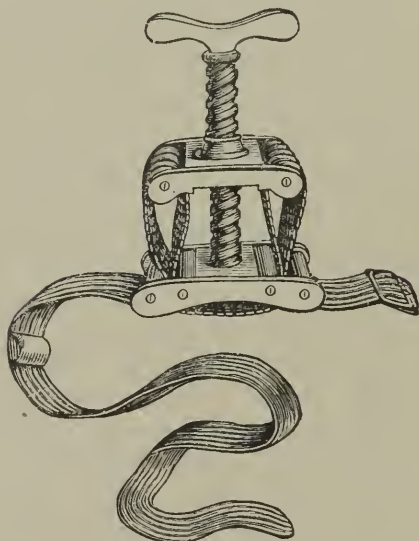
A Graduated Compress, placed above or below, as Compress. the case may require, secured by a bandage, may be used.

If it be at hand, first cover the wound with bichlorid gauze. If alone, and without proper conveniences, anything may be used.

Spanish
windlass.

A handkerchief folded triangularly, and tied in a loop,

FIG. 23.



Petit's Tourniquet.

the knot over the vessel, pressure being applied by means of a stick by which the handkerchief can be twisted, forming what is called the "Spanish Windlass," is excellent.

Instruments
used.

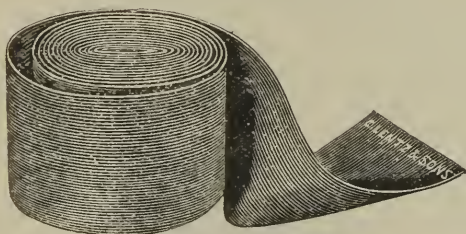
In amputations and other major operations, the

great aim is to avoid loss of blood ; and for this purpose various instruments are employed by the surgeon.

Petit's Tourniquet consists of a strap fastened to a chain or key, which is held in position by a buckle. Petit's
tourniquet.

In using this instrument, a primary roller is first applied, then the tourniquet, buckling the strap over the roll of bandage. Before handing this tourniquet, always be sure that the little pad beneath the buckle is in perfect order.

FIG. 24.



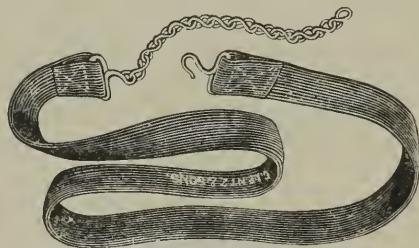
Esmarch's Rubber Bandage.

Esmarch's Rubber Bandage is applied in operations upon the extremities, to save loss of blood. Esmarch's
rubber
bandage. Begin to bandage from the lower extremity of the limb, thus forcing the blood up above the point of operation, where the tourniquet or rubber tubing is applied, the latter being fastened by means of a hook and chain.

It is usually necessary to have an assistant to hold the limb and bandage in position, especially in hip-joint and shoulder amputations. Hemorrhage, in hip-

joint amputations, is difficult to control on account of the size of the vessel.

FIG. 25.

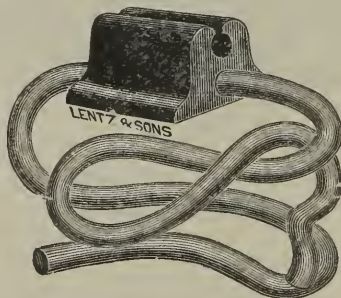


Esmarch's Tubing.

Forceps.

Other instruments used are the *Hemostatic Forceps*, which catch the vessel firmly and differ from the

FIG. 26.



Esmarch's Hard Rubber Compress.

dressing forceps by coming closely together at the points, being perfectly flat, and are usually in two pieces.

Dressing forceps are hollowed out on the inner side.

Liston's self-closing artery forceps, once applied, Liston's. keep in position, but are now seldom used.

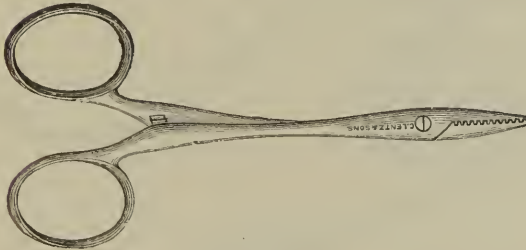
The tenaculum is a hook-like instrument, useful as a Tenaculum. retractor.

FIG. 27.



Liston's Self-closing Artery Forceps.

FIG. 28.



Hemostatic Forceps.

FIG. 29.



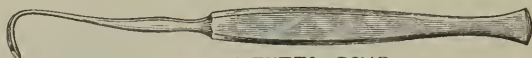
Tenaculum.

The aneurism needle is a long, curved instrument, Aneurism
used to pass the ligature around the artery, made blunt, needle.
to avoid injuring the vessel.

Acupres-
sure pins.

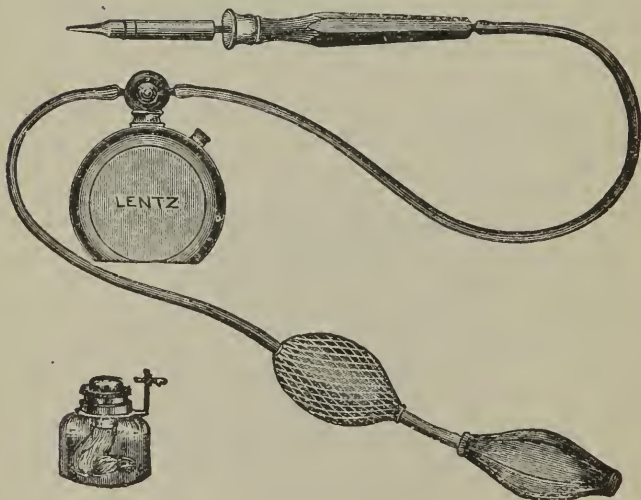
Acupressure pins are spear-pointed pins which are passed through the tissues of a wound, so as to com-

FIG. 30.



C. J. LENTZ & SONS
Aneurism Needle.

FIG. 31.



Paquelin's Cautery.

press and close, by the middle portion of the needle or pin, the tube of the bleeding vessel.

Harelip-pins are often used in scalp wounds, and are ^{Harelip} secured by a suture of the same name. Any large-_{pins.} headed steel pin may be used for the same purpose.

Still another way of arresting hemorrhage is by the ^{Cautery} use of the actual cautery, Dr. Paquelin's being the most convenient.

CHAPTER VIII.

HEMORRHAGE (Concluded).

CONSTITUTIONAL TREATMENT—POSITION—STIMULANTS—KINDS OF HEMORRHAGE.

Constitutional
treatment.

The first step in the treatment of hemorrhage, after the bleeding has been stopped, is to place the patient in a condition of absolute rest, both mental and physical ; noise and worries of every kind should not be allowed to disturb him.

The loss of blood has lowered the temperature of the body, so external heat, by means of hot-water cans or bottles, must be applied, being careful that they are well protected, and not so hot that the patient runs the risk of being burned. Some surgeons suggest the use of a water bed, filled with hot water, when the temperature of the patient has been greatly reduced.

Position.

The position of the patient is also important ; remove the pillow, and elevate the foot of the bed, to allow a sufficient flow of blood to the brain, and so overcome faintness.

Stimulants.

Few surgeons advise the use of stimulants in large quantities, at such a time, as they increase the action of the heart. Moreover, the stomach is incapable of absorbing much of anything. Ammonia is considered better to give than brandy.

One of the most distressing symptoms is the excessive thirst, occasioned by the loss of fluids from the system. This is best allayed by giving sips of **hot** water, in preference to cold; bits of **crushed** ice, or injections of **hot** water. The hot water, being at a temperature a little above that of the body, is more readily absorbed. To allay thirst.

In cases of extreme restlessness one-half grain opium suppositories are often given.

As the patient becomes convalescent, great care should be taken that he does not become over-fatigued or worried in any way. Moderate exercise in the open air is good; and when the system recovers sufficient strength, mineral tonics, such as iron, are usually given; increase the diet, giving easily assimilated, nitrogenous food. Care of patient.

Epistaxis, bleeding from the nose, is often met with; and in many people the disease is periodical, and has a beneficial effect upon the patient. It is usually caused by plethora, injury, vascular excitement, determination of blood to the head, or by a want of tone in the blood-vessels, and is preceded by headache and giddiness, accompanied by flashes of light. Kinds of hemorrhage.

Small doses of salts, taken daily, or any of the saline waters will generally afford relief. This mode of treatment is sometimes spoken of as "bleeding the patient through the intestines."

If, however, the hemorrhage amounts to more than dripping, it may become serious and require surgical attention. In any case do not allow the patient to

hang his head down, for when the neck is flexed upon the chest, it prevents the return of blood to the heart and increases the congestion, thus increasing the flow of blood.

Place the patient in a recumbent position, head thrown back and turned to one side, placing towels or a sponge near the nostrils to catch the discharge. An old and very simple treatment is to drop cold keys or pennies down the back; or gently rub the temples, cheeks, nose, and nape of the neck with ice. In both cases the effect is the same, as cold applied to the surface of the body stimulates the nerves and causes the vessels to contract.

Ice-cold astringent solutions of alum, gr. xx or gr. xxx to the ounce, or tannin, one drachm to one ounce of water, are sometimes injected up the nostrils. Direct the patient to take long, full, deep breaths, which act by facilitating the return of blood to the heart, and so relieve congestion.

In some cases, as in fracture of the nose, or where there is a tumor, extreme measures have to be employed, such as plugging the posterior nares. This is accomplished by the use of Bellocq's canula, or a soft rubber catheter.

The canula, armed with a strong ligature, is gently passed up the nostrils, until it can be seen protruding into the mouth, when the ligature is seized and brought out of the mouth, and secured to a plug of lint or antiseptic gauze; upon withdrawing the instrument, the plug is brought into position in the posterior nares,

Plugging
posterior
nares.

when the anterior nares is also plugged. The end of the ligature is allowed to protrude from the mouth to facilitate its removal.

At best, this is harsh treatment, and the more humane way is to find the point of bleeding, and apply the cautery.

Hemoptysis, or spitting of blood, is the most common form of bleeding from disease. Hemoptysis. It may be moderate, considerable, or severe, and may occur once or be repeated a number of times.

Patients suffering from consumption all display one characteristic—in repudiating the fact of severe illness, until a hemorrhage occurs, when they become wild with fear and excitement. As in all other cases of hemorrhage, it is of vital importance to impose absolute rest and quiet, keeping the patient in a recumbent or semi-recumbent position, propped up with pillows.

If alone in such a case, place a teaspoonful of salt upon the tongue, and direct the patient to swallow it. Treatment
when alone It is sometimes well to add a little vinegar.

Ergot may be given in doses of from 30 to 60 drops. Do not repeat if 60 drops be given. The better way is to give a small dose, say 40 drops, and follow it in a short time by 30 drops.

Cold applied to the surface of the body is also good. Bare the chest and allow the cold air to strike it ; in some cases, rub the chest with ice ; of course care must be exercised that this treatment is not continued too long.

In all cases hemorrhage is followed by more or less

exhaustion. Care should be taken in administering stimulants, aromatic spirits of ammonia being better than brandy.

Hemorrhage from stomach. Hemorrhage from the stomach is rare, but sometimes occurs, taking place in gastric ulcer or cancer of that organ.

The treatment consists in applying astringents or local styptics, as tannic or gallic acid. Tannic acid, applied to a wound, coagulates the blood; but when given internally, is changed into gallic acid; hence, if bleeding be from the stomach, give tannic acid, and if from some organ remote from the stomach, give gallic acid. The dose is gr. x, repeated in 20 or 30 minutes.

Blood coming from the nose or mouth is often swallowed, in which case it undergoes a change in the stomach, which gives it the appearance of "coffee grounds."

Vicarious. In vicarious hemorrhage, instead of bleeding from the uterus, the blood passes through different channels; as there must be some outlet, this form is not arrested.

Bowels. Hemorrhage from the bowels occurs in typhoid fever, or any ulceration of the bowels, or disease of the rectum. The patient may suffer from all the general symptoms, or the first indication of any serious trouble may be in the passage of a "bloody stool," composed of tarry, black masses. The loss of blood into the intestines is attended by the same result, as by direct loss from the body itself, as after it passes into the intestines it is lost to the system. It undergoes no change, and may be passed its natural color. Opium or tannic acid

suppositories are usually given, with injections of alum or plain ice water, and cold applications to the abdomen. Starch and laudanum injections are also given.

To control hemorrhage from the rectum, the Rectum. "Catheter en chemise" is employed. To prepare this instrument, take a square of lint from $1\frac{1}{2}$ inch to 2 inches in size, cut a small notch in the center, through which pass the catheter, secure the lint by means of a bit of silk, and the instrument is ready for use.

There is always more or less flatulency about the rectum; the hole in the catheter permits it to pass out, and so lessens the pain; the lint at the end gives the surgeon complete control of the packing he may wish to insert, as it is impossible for any substance to pass beyond the lint. In hemorrhage from the male bladder the same instrument is employed.

CHAPTER IX.

FRACTURES AND DISLOCATIONS.

KINDS—SIGNS—DIFFERENCE BETWEEN FRACTURE AND DISLOCATION—TREATMENT.

Kinds of fracture.

A fracture is the solution of the continuity of a bone ; and may be either—

Simple, where the bone alone is broken, with no external wound ;

Compound, where there is an open wound leading down to the seat of fracture ;

Comminuted, where the bone is broken in more than one place ;

Incomplete, or “green-stick,” where the bone is only partly broken ; this fracture occurs usually in young children ;

Impacted, where one end of the bone is driven into the other.

Signs.

The signs of fracture are pain, swelling, deformity, unnatural mobility, and crepitus.

Crepitus cannot be felt in an impacted or “green-stick” fracture, where there is a gap between the ends of the bone, or where the soft tissues intervene.

Bones are part of the vital structure and any injury to them may prove fatal. Old people often die from a simple fracture.

If undecided whether the injury be a fracture or a dislocation, use traction ; the deformity will disappear, but upon relaxation will again show itself in a fracture, while in a dislocation, the deformity once reduced will not return.

Difference between fracture and dislocation.

The first treatment in either case is to put the part at rest.

Treatment of simple fracture.

In simple fracture, make gentle extension, to bring the parts in apposition ; this may require some strength and is also attended with some risk by one who is inexperienced, as a simple fracture may be rendered compound by rough or careless handling. So the better plan for a nurse is to use any simple dressing, such as a pillow, tied lightly about the limb, or a simple, well-padded splint, in order to keep the part at rest.

The best position being that which is most comfortable to the patient.

Compound fractures are always dangerous ; the degree of danger is not so much dependent upon the fracture, as upon the entrance of air into the wound, and injury of the surrounding tissue.

It is usually attended by hemorrhage and shock.

The wound should be first thoroughly cleansed and disinfected by the use of bichlorid and a syringe, the surrounding parts shaved, and an antiseptic dressing applied.

As shock is generally present, the utmost care and gentleness must be exercised in making extension.

The precaution of exposing the patient as little as

possible should be observed, even in summer, when the surrounding atmosphere is warm.

If there be no surgeon at hand, and it is necessary to transport the patient, use pillows or a splint sufficiently long to support the joint next above the seat of fracture. In lifting or holding a fractured limb, always be careful to support it above and below the seat of fracture, making gentle extension.

Colles'. In Colles' fracture, there is a curved appearance at the back of the wrist. For a temporary dressing, place the arm upon a pillow until surgical treatment can be obtained. It is usually dressed with a Bond splint.

Clavicle. In fracture of the clavicle, the arm on the injured side sinks, and the patient will support it at the elbow; so the same position should be observed in applying the sling.

Spine. Fracture of the spine at the neck is always fatal.

At the dorsum, the nervous center is much affected.

There is always complete paralysis below the seat of fracture, the bladder and rectum being both affected.

Retention of urine changes to incontinence of both urine and feces. Place the patient upon his back, if possible, upon a water bed. The greatest care will be necessary to prevent bed-sores. Bathe daily, and rub briskly with a coarse towel or brush, using alcohol and alum to harden the skin. Even with a water bed it is necessary to resort to change of position and rings, to prevent pressure.

Skull. In fracture of the skull, signs of concussion are often present, and are accompanied by pallor of the

face and feeble respirations, with more or less unconsciousness.

In a depressed fracture, there are symptoms of compression of the brain, which are complete loss of consciousness, respirations slow and labored, pulse slow and hard, like a sledge-hammer, pupils of the eye dilated or unequal.

In fracture at the base of the skull, there may be bleeding from the nose, mouth, or ear, or a watery discharge from the ear.

Convulsions may follow a compound fracture of the skull. In such a case the nurse may only cleanse the wound with the utmost care, and send for the surgeon at once, thus taking no responsibility whatever upon herself. If there be pressure upon the brain, in all probability "trephining" will be performed.

Dislocations of any kind are extremely painful, and require prompt surgical attention. Dislocations.

A dislocation is the displacement of the articular surfaces of the bones which form a joint, and may result from five distinct classes of causes: 1st, direct violence; 2d, indirect violence; 3d, muscular contraction; 4th, disease of the articular surfaces of the bones; 5th, destruction of the ligaments by ulceration, suppuration, or injury. Definition.

The symptoms are: 1st, deformity of the joint; 2d, loss of voluntary motion; 3d, impaired actual mobility. Symptoms.

The first thing is to place the limb in a comfortable position as indicated by the patient. Treatment.

If the injury be at the shoulder or elbow, place the Shoulder.

arm in a long sling to support the injured part, placing the forearm in such a position that the thumb points up.

Hip In dislocation of the hip, the patient will hold the limb, crossing one limb over the other ; or the foot may be abducted.

Jaw In dislocation of the jaw, the chin is thrown forward. In order to reduce, protect the thumbs and insert, placing them upon the molar teeth, gently pressing the jaw into position. This dislocation is extremely painful, and frequently occurs.

In dislocation of the hip or knee, or in old injuries, where it is difficult to reduce, an anesthetic is usually administered, in order to relax the muscles as well as to relieve pain.

In all cases of dislocation and fracture, the nurse must be extremely careful in assuming responsibility ; it is far better to do too little than too much.

CHAPTER X.

NURSING SPECIAL CASES.

ABDOMINAL SURGERY IN GENERAL—CLEANING TUBE—BANDAGES
—OVIOTOMY—APPENDICITIS—LACERATED PERINEUM—
LITHOTOMY AND LITHOTRITY—TRACHEOTOMY—TREPHIN-
ING AND CONCUSSION—HIP DISEASE AND EXCISION IN
CHILDREN—AMPUTATIONS.

The preparation of the patient having already been given in a previous chapter, it is unnecessary to repeat. Abdominal surgery in general.

After an operation the recumbent position must be carefully maintained, although the nurse is generally allowed to change the position after a few hours, turning the patient carefully upon his side, and securing this position by means of pillows. Of course this is never to be done without permission from the surgeon.

A round, firm pillow is usually placed under the knees to relieve all strain from the abdominal muscles.

The wound should be well supported by placing the hand over it, in case of retching, sneezing, or coughing.

A glass drainage tube, either bent or straight, is often inserted, the cleaning of which is very frequently left entirely to the nurse. Cleaning tube. It may be done either by the use of a long, slender-nozzled syringe, or by means of cotton ropes. If the former means be employed, the syringe should be kept in bichlorid solution, when not

in use, being careful to first fill and expel distilled water through the same before insertion.

Pass the syringe down carefully and withdraw the discharge, saving it for measurement; then wash out with warm distilled water, and insert a pledget of antiseptic cotton before replacing the binder.

If a cotton rope be used, separate a piece of antiseptic cotton lengthwise, twist it firmly, care being taken to have it thick enough so that it will not slip through the tube.

Attach the end to a long cotton applicator, and carry it down into the tube, repeating the process, using a

FIG. 32.



Uterine Syringe.

fresh rope each time, until the tube is thoroughly cleared from all discharge. Keep the cotton carefully protected from the atmosphere by wrapping it in an antiseptic towel, or by placing it in a glass jar. It is also necessary to have the hands thoroughly aseptic before beginning operations. It is well to clean the tube as quickly as possible, in order to prevent the air from entering the wound. The surgeon will at all times give explicit directions as to the manner and time of cleansing.

In preparing a dressing, if a tube is to be inserted, a small hole is usually cut in the center of the gauze,

through which the tube can pass; the same precaution is observed with the cotton; a square of rubber film is then prepared in the same manner, and placed over the dressing; a piece of antiseptic cotton is finally placed over the tube and the four corners of the rubber film are then secured by means of a safety pin. In this manner the tube can easily be cleansed without disturbing the dressing in any way.

A many-tailed or Scultetus bandage, made of flannel, ^{Many-tailed bandage.} is used. It should be one and a half ($1\frac{1}{2}$) yards in length and of sufficient width to reach from the lower end of the breast bone to the pubes. In a many-tailed bandage the material is simply torn into strips about three or $3\frac{1}{2}$ inches wide, from both ends, until within about two inches of the center; the ends are then passed about the body, overlapping about one-third, and secured with safety pins.

In making a "Scultetus" bandage, the same length ^{Scultetus} of material is used, but it is torn into strips, preferably about four inches wide, laid one upon the other, overlapping one-half, and beginning from above downward, so that the bandage may be applied from below up.

A slightly wedge-shaped piece of material is fastened securely down the center, the broader end at the base.

In using this bandage more even support is given to the abdomen, for if properly applied the pressure is equal at every point. It can also be kept in position much better. The center piece is best secured by "cat stitching" at either edge.

In almost all cases, the patient will be allowed no

nourishment for the first 24 hours ; after that, beginning in small quantities, half an ounce or less is given, according to the requirements of the case.

In this, also, the surgeon will give explicit directions.

The temperature of the room is usually kept at 70° Fahr.

Ovariectomy. In addition to the ordinary rules to be observed, the catheter is sometimes ordered to be passed for two or three days previous to the operation, and should always

FIG. 33.



Abdominal Bandage.

be passed immediately before, so that the bladder is thoroughly emptied.

Secondary hemorrhage may occur from the giving away of the blood-vessels. The temperature and pulse should be carefully noted, also any undue pain in the abdomen, as peritonitis often occurs after this operation.

The patient is often quite hysterical and exceedingly restless.

The after-treatment in appendicitis is the same as in other abdominal operations, a glass drainage tube being

used in some cases. The operation is usually successful, the patient frequently recovering in from ten days to two weeks.

In lacerated perineum, the knees are bound firmly together to keep the parts in apposition. The utmost care must be exercised in using the catheter, that not even a drop of urine falls upon the parts, thereby causing suppuration. ^{Lacerated perineum.}

The operation of cutting into the bladder for the removal of a stone is called lithotomy, that of crushing the stone by an instrument, passed into the bladder, lithotrity. ^{Lithotomy and lithotrity.}

After both operations, particular care must be given to the condition of the bed, which must be kept warm and dry,—not an easy task, as the water is constantly dripping through the wound in the perineum.

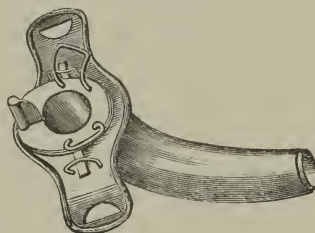
The back will require careful attention to prevent bed-sores. It will be found very convenient in such a case to make pads of oakum covered with cheese-cloth, and place under the patient; by slipping a small piece of mackintosh underneath, and changing the pads frequently, the bed may be kept perfectly dry.

Secondary hemorrhage frequently occurs, especially in children. The nurse should also keep herself informed as to whether the water passes through the wound or through the natural channel, and if it contains blood or clots.

Tracheotomy, the operation of opening the wind-pipe, is performed when the patient is in danger of suffocation from obstruction of the air passage. ^{Tracheotomy.}

The management of the patient after the operation devolves almost entirely upon the nurse, who must be most attentive. 1st. To keep the tube clean ; 2d. To

FIG. 34.

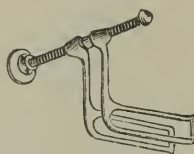


Double Silver Tracheotomy Tube.

prevent the access of cold air ; 3d. In feeding the patient.

Every nurse who undertakes the care of the case should be familiar with the ordinary tracheotomy tube

FIG. 35.



Golding-Bird's Dilator.

in use, the silver double tube. This is composed of an outer and an inner tube ; the outer one supplied with two slits on either side of the guard, through which pieces of tape are passed, sufficiently long to tie around

the neck, thus securing it in position; while the inner one can be taken out and cleansed as often as necessary. This is kept in place by a little catch at the upper end of the guard. It is also well to have the trachea for-

FIG. 36.

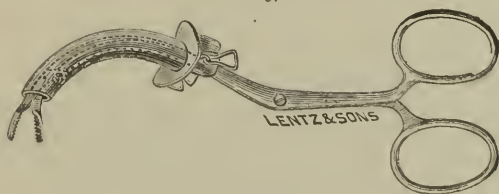


Trousseau's Forceps.

ceps and dilator at hand in case of an accident, the forceps often proving useful in removing mucus.

The tube is cleansed by passing a feather down, deftly turning it around as it is drawn out. Cleaning tube.

FIG. 37.



Collins' Tracheotomy Forceps.

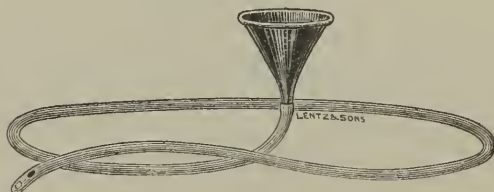
The feather should be partly stripped, the end only being used, keeping it in boric acid solution.

It is often necessary to remove the inner tube entirely. This is done by holding the outer tube gently in

place against the wound with the left hand, while the inner tube is being drawn out. The tube sometimes becomes very heavily coated, in which case it is changed.

Sometimes a tent is fashioned about the head of the bed, and a steam atomizer kept in constant play to add warmth and moisture to the air; or light flannel cloths or pieces of gauze, wrung out of hot water, are placed over the tube. It is always well to have plenty of pieces of soft linen or cheese-cloth at hand to catch

FIG. 38.



Stomach Tube.

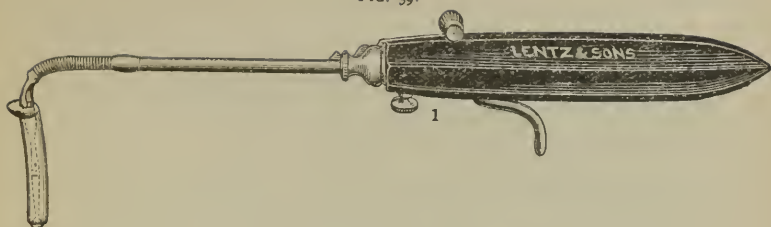
the mucus coughed through the tube. This will most frequently occur after taking nourishment of any kind.

Great care must be taken to avoid all draughts, as the patient is very apt to contract pneumonia. In a case of diphtheria, the nurse should be careful to stand at one side of the patient, in order to avoid contact with the contents of the tube; and all cloths used should be immediately burnt.

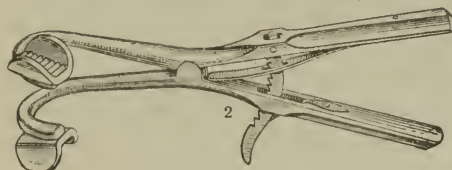
Feeding.

All nourishment should be taken very slowly and in small quantities, as it is likely to induce coughing,

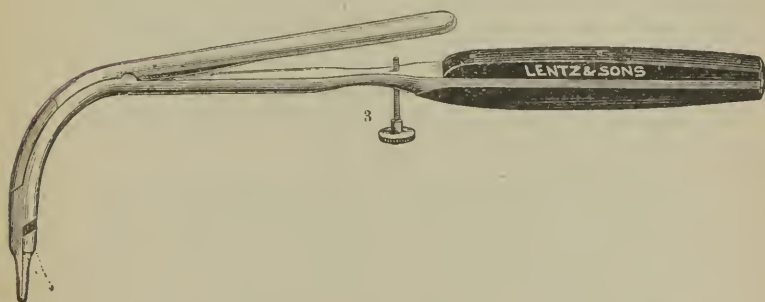
FIG. 39.



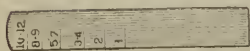
Intubation Tube and Introducer.



Denhart's Mouth Gag.



Intubation Tube Extractor.



O'Dwyer's Intubation Scale, Set.

7



Larynx Tube.

and is generally painful to the patient, especially with children. Where a sufficient quantity cannot be taken it is sometimes necessary to give it through the nostrils or rectum.

In the former case a soft rubber catheter is passed up the nostril to the pharynx, and so to the gullet, the nourishment being poured down by means of a funnel.

The patient should be kept as quiet as possible, and not attempt to talk.

Intubation
of the
Larynx.

Intubation is now widely employed as a substitute for tracheotomy, a metallic tube being introduced into the larynx and allowed to remain in position for a few days.

Trephining
and concus-
sion.

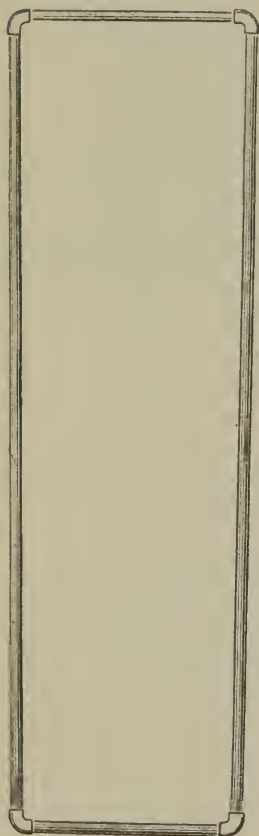
After the operation of "trephining" the patient should be kept in a recumbent position, not being allowed to raise the head or move himself suddenly, as hemorrhage might occur. As in all injuries to the brain, the room should be kept darkened and as quiet as possible.

In concussion of the brain the same rules are to be observed. Cold is always applied to the head, either by means of an ice-cap—coils of rubber tubing kept filled with ice water—or an ice-bag.

The latter is partly filled with moderate-sized pieces of ice, the bag wrapped in a thin towel or piece of cheese-cloth in such a manner that the open end is up, in order to prevent the melted ice from running out and getting the bed wet.

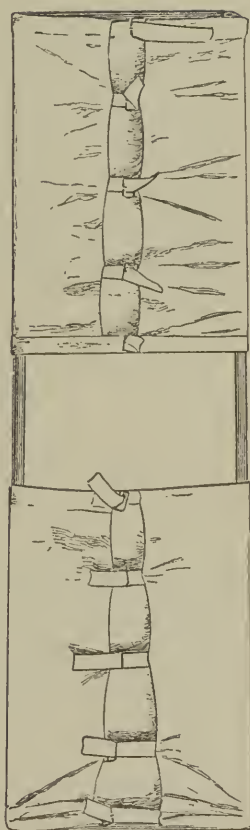
The condition in which the patient is kept is quite a test of the carefulness of the nurse, for the ice will

FIG. 40.



Frame for Hip-joint Disease.

FIG. 41.



Covered.

melt and the water will require to be poured off frequently if the patient is to be kept dry and comfortable.

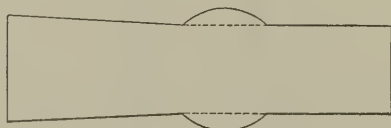
Hip disease
and excision
in children.

Hip disease, and the operations resulting from it, are exceedingly trying in children, on account of the difficulty experienced in keeping them quiet.

This difficulty is overcome in some hospitals by the use of a frame, fashioned like the accompanying illustration, the head being a little broader than the foot, to give the shoulders plenty of room.

A piece of canvas is securely fastened by means of straps and buckles, across either end, reaching from the

FIG. 42.



Frame for Hip-joint Case.

end to the enlarged opening in the center, which is designed for convenience in dressing the hip.

A small sheet is then folded to fit the frame, and is securely pinned in place on the under side.

The child is placed upon the frame and held in position by a broad band passed about the frame over the chest.

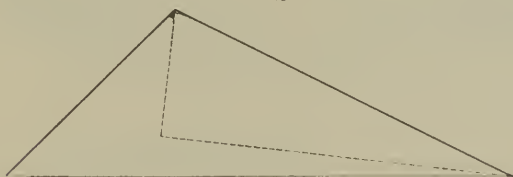
The children are quite comfortable and can be easily moved, by simply lifting the frame. In this manner they can be taken out of doors, placed upon cots, the extension still being applied.

It will also be found that much pain can be saved the little sufferer by using the triangular bandage in dressing the hip, doing away with the lifting and straining which are almost unavoidable in applying a spica. Triangular bandage in hip dressings.

The bandage should be made of light muslin or cheese cloth, and folded as in the illustration, the dotted lines representing the lower edge folded over.

In applying the bandage, the longest end is passed under the back, far enough to reach more than half way around the waist, the other end being passed over the

FIG. 43.



Triangular Hip Bandage.

anterior aspect of the thigh, then under, and up to the waist line, to meet the other end of the bandage, where it is secured with a safety pin; the lower edge is fitted neatly around the limb, and also secured with a small safety pin.

A little practice will render the nurse very deft in the application of this dressing, which remains firmly in place and is comfortable.

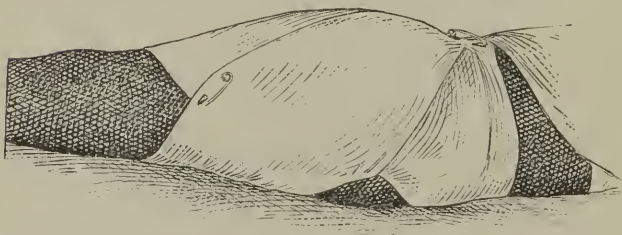
It is also an excellent bandage to use in case of psoas abscess, even with an adult, as it can be made in any size. With children, special care is also necessary in

regard to the extension, keeping careful watch of the condition of the skin, which is very apt to become excoriated from the plaster.

FIG. 44.



FIG. 45.



Triangular Hip Bandage Applied.

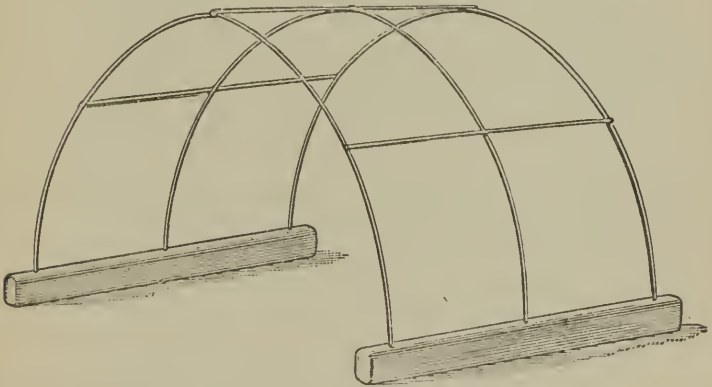
Amputations.

The same general rules apply to these operations as to all others, the great danger being from hemorrhage, which may occur soon after the operation, or some days later. In order to prevent it, the limb should be

elevated upon pillows ; sometimes the foot of the bed is elevated. The stump should be lightly covered, a "cradle," or wire frame, being placed underneath the bedding to prevent pressure upon the limb.

Where hemorrhage is expected, a tourniquet is sometimes loosely applied, and can then be easily adjusted ; or Esmarch's rubber tubing may be conveniently at hand.

FIG. 46.



Cradle.

The patient should be kept quiet, and carefully watched until all danger of hemorrhage is passed, which, in case of a hip-joint or thigh amputation, may not be for two weeks. Care should also be taken that the patient does not hit the stump during his restlessness.

In raising the stump, never lift it from the end, but

pass the hand gently between the limb and the pillow from above, supporting it steadily while the pillows are being changed or the dressing done.

Stump dressings vary in shape as the surgeon may prefer, sometimes being made in the form of a "Mal-

tese" cross, or



but more frequently a sim-

ple oblong dressing of sufficient size to come well up on the stump.

CHAPTER XI.

BANDAGING.

USE OF BANDAGES — MATERIALS EMPLOYED — DIMENSIONS —
KINDS—METHOD OF ROLLING BANDAGE—GENERAL RULES
FOR APPLYING—SPECIAL BANDAGES.

Bandages constitute a very important part of all surgical dressings, and are employed to retain dressings in position, to make pressure, and in the adjustment of splints. Use of bandages.

They may be prepared from muslin (bleached or unbleached), linen, crinoline, cheese- or tobacco-cloth, flannel, or rubber sheeting. Materials used. The unbleached muslin is commonly used on account of its cheapness, but bleached muslin, which has been previously washed, is much nicer.

Crinoline is usually employed in the preparation of plaster-of-Paris bandages, but is also used by some surgeons without the plaster, in which case it is first wet, and as it dries upon the part gives a firm support.

Cheese or Tobacco Cloth is employed in many cases to confine the first dressing, as it adapts itself more readily to the part, so retaining the dressing in better position. It is also largely employed in preparing the plaster-of-Paris dressings.

The **Rubber** bandage is used in operations upon the

extremities, and also to reduce swelling and give firm support to a limb.

Flannel bandages are used for the head, eyes, on the limbs, to prevent or reduce swelling, and underneath plaster-of-Paris dressings.

Dimensions. Bandages vary in length and width according to the purpose for which they are employed. Those most frequently used are, *one* inch wide, three yards in length, for hand, fingers, and toes. *Two* inches wide, five yards in length, for the head and for the extremities in children. *Two* and *one-half* inches wide, seven yards in length, for the extremities in adults. *Three* inches wide, nine yards in length, for thigh, groin, and trunk.

Varieties of bandages. Bandages may be roughly divided into simple and double rollers, and the handkerchief or triangular bandage.

The **Roller** bandage consists of a strip of some one of the materials previously mentioned, of a suitable length and width for the purpose for which it is to be employed, and for convenience in application is rolled into a firm cylindrical ball.

The bandage should consist of one piece, free from seams and selvage, for if there are seams or creases in the bandage, it cannot be neatly applied, and is apt to be uncomfortable to the patient. It should also be free from all loose threads, and for this reason all material used, with the exception of cheese or tobacco cloth, should be torn into strips, not cut. With cheese cloth it is necessary to cut by a drawn thread, in order to secure an even edge. Every nurse as well as physician

should be able to roll a bandage firmly and evenly either by hand or machine.

To roll a bandage by hand the strip should be folded at one extremity several times until a small cylinder is formed ; this is then grasped by the thumb and index finger of the right hand ; the free extremity of the strip is held securely between the thumb and index finger of the left hand, and by alternate pronation and supination of the right hand the cylinder is turned and the roller formed. The firmness of the bandage is regulated by the amount of tension which is made upon the free extremity of the bandage during the revolutions of the cylinder.

Method of
rolling
bandage.

There are several machines made for winding bandages, all working upon the same general principle. The "Jobse" is to be preferred, as it has a guide to keep the bandage even, and by the adjustment of an under screw can be attached to any table or chair.

A single bandage rolled into the form of a cylinder is called a single or single-headed roller ; if rolled from each extremity toward the center, it is called a double or double-headed roller.

A roller bandage may be described as consisting of an **initial extremity**, the free end of the bandage ; a **terminal extremity**, the end which is enclosed in the center of the cylinder ; a **body**, that portion between the extremities ; and two surfaces, an internal and external surface.

In applying a roller, fix the external surface of the initial extremity upon the part, holding it in position

General
rules.

FIG. 47.

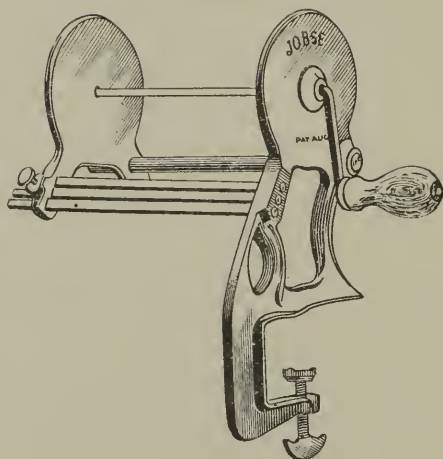
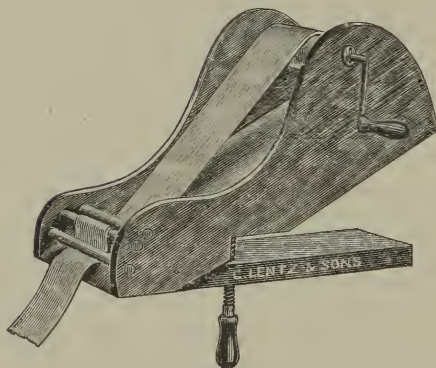


FIG. 48.



Bandage Rollers,

with the fingers of the left hand, until firmly fixed by a few turns of the roller.

In this way the operator has more control over the bandage. Care should also be taken that the turns are applied smoothly to the surface, and a uniform pressure exerted throughout the length of the bandage, each fold overlapping the other equally, and all reverses coming on the outside of the limb. Care should also be taken that the limb is in the position that it is to occupy, as regards flexion and extension, upon the completion of the dressing. A bandage applied when the limb is flexed, will exert too much tension when the limb is extended, and so may become very uncomfortable and even dangerous to the patient. When the bandage has been applied the terminal end is secured by means of a small straight pin or safety pin inserted in such a manner that the point is buried in the folds of the bandage. If the bandage be narrow, the end may be split, and the two tails secured around the part by tying.

In removing a bandage, the folds should be carefully gathered up into a loose mass and rapidly transferred from one hand to the other as the bandage is unwound.

To remove
a bandage.

If the bandage be cut, scissors especially designed for the purpose, having one blade longer than the other, the point protected by a guard, which may be readily slipped under the bandage, will be found more convenient.

A circular bandage consists of a few circular turns around a part, each turn covering accurately the pre-

Kinds of
bandage

Circular
bandage.

ceding turn. This bandage may be used to a limited portion of the head, neck, or limbs, or to make compression upon the veins before venesection.

FIG. 49.



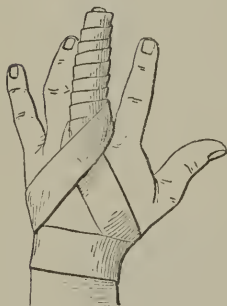
Bandage Scissors.

Oblique
bandage.

In the oblique bandage the turns are carried obliquely over the part, leaving open spaces between the turns. It is employed to retain temporary dressings.

FIG. 50.

Spiral
bandage.

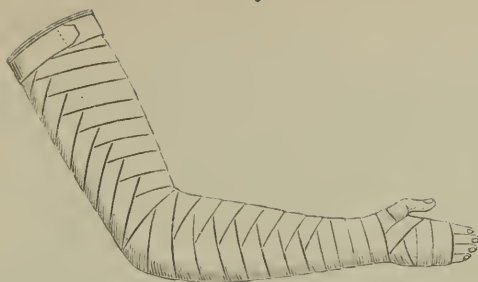


Spiral Bandage of the Finger.

Spiral
reversed.

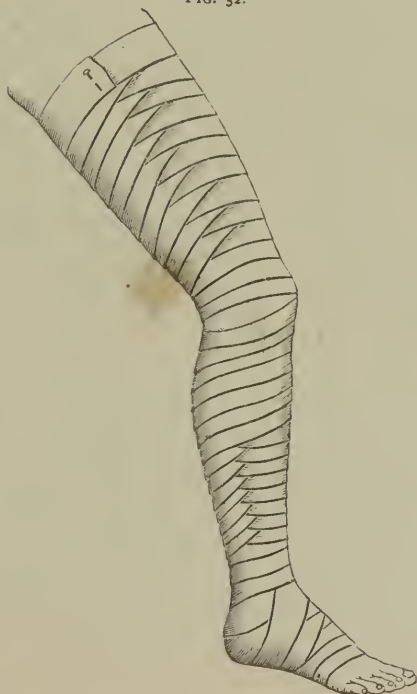
The spiral reversed differs from the spiral in having its turns folded back or reversed, as it ascends a limb the diameter of which gradually increases.

FIG. 51.



Spiral, of Upper Extremity.

FIG. 52.



Spiral-reverse, of Lower Extremity.

To apply the bandage, the operator should stand in front of the subject, and after fixing the initial extremity of the roller, the bandage is carried off a little obliquely to the axis of the limb; the index finger or thumb of the disengaged hand is placed upon the body of the roller to hold it securely in position; the unwound portion of the bandage is slackened, and by changing the position of the hand from extreme supination to pronation

the reverse is made. Care should be taken not to attempt to make a reverse while the bandage is tense, for it is impossible to make it evenly, and it is therefore uncomfortable to the patient. Complete the reverse before carrying the bandage around the limb, and when it has been completed the bandage may be slightly tightened to conform closely to the part.

The reverse should not be made

over the bone, but upon the outer portion of the limb, each turn being in line with equal tension, in order to present a good appearance, at the same time proving comfortable to the patient. This bandage is used to retain dressings upon the extremities, in applying extension, and to give support to the limb.

When the turns of a roller cover each other obliquely, leaving the previous turn about one-third uncovered, the bandage is known as a spica bandage.

FIG. 53.



Spica, of Instep.

Spica.

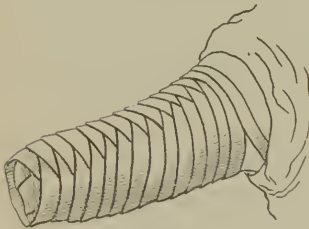
This bandage is used to retain dressings upon par-

FIG. 54.



Figure-of-8 of Ankle.

FIG. 56.



Recurrent Bandage of Stump.

FIG. 55.



Barton's Bandage.

FIG. 57.



Recurrent Bandage of the Head.

ticular portions of the surface of the body, such as the

shoulder, groin, or foot. In applying the bandage to the shoulder, the turns are begun at about the middle third of the arm, and upon approaching the upper third, the roller is carried over the opposite shoulder; in the groin the upper portion of the bandage passes around the waist; and in the foot the upper turns pass around the ankle.

Figure-of-eight bandage.

In this bandage the turns are applied in such a manner as to form the figure 8. These turns are used in the application of Barton's bandage, the bandage of the knee, elbow, and many others.

The recurrent bandage.

In the recurrent bandage the roller, after covering a certain portion of the surface, is brought back to the point of starting; it is then reversed and carried toward the opposite point. This manipulation is continued until the part is covered by these recurrent turns, it is then secured by a few circular turns. It is usually employed in the dressing of stumps and in the head dressings.

Compound bandages.

Compound bandages are usually composed of several pieces of muslin or some other material, and are employed to retain dressings to some particular part of the body. The most useful are the T-bandages and the many-tailed bandages.

T-bandages.

The single T-bandage consists of a horizontal band to the middle of which is attached another vertical band. The horizontal band should be about twice the length of the vertical piece. This bandage may be conveniently used to retain dressings to various parts of the body, being modified to meet the requirements of the

case. The double T-bandage has two vertical strips attached to the horizontal piece. It may be used for

FIG. 58.



T-Bandage of the Eye.

FIG. 59.



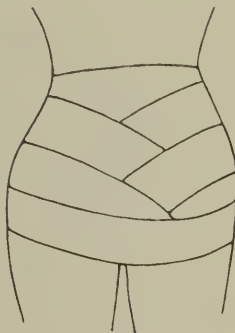
Four-tailed Bandage of the Head.

much the same purpose as the single T-bandage, and will be found convenient in retaining dressings to the chest, breasts, and abdomen. It may also be used to secure dressings to the nose, the strips in this case being about one inch in width.

These bandages are prepared from pieces of muslin of different lengths and widths, which are torn from both ends into two, three, or more tails, up to within about three inches of the center, their width and length being regulated by the body to which they are to be applied.

They may be used as a temporary dressing in case of

FIG. 60.



Eight-tailed Bandage of the Abdomen.

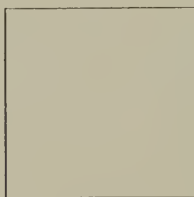
Many-tailed
bandages.

fracture of the jaw or clavicle, or to retain dressings upon the chin, scalp, abdomen, and trunk. It is used entirely by some surgeons in cases of laparotomy, in which case the bandage is prepared from a piece of flannel $1\frac{1}{2}$ yards in length and about 20 inches wide, being torn into eight strips. The body of the bandage is placed upon the patient's back and the ends crossed upon the abdomen and secured by safety pins.

Handkerchief bandage.

The handkerchief bandage may be used for a variety

FIG. 61.



The Square.

FIG. 62.



Oblong.

of cases to great advantage in the temporary or permanent dressing of wounds, fractures or dislocations.

The handkerchief or square may be converted into an oblong, made by folding the square once or twice upon itself.

The triangle.

The triangle, made by bringing the diagonal angles of the square together, the line of folding being known as the base, the angle opposite the base the apex, and the other angles the extremities. It is used to confine dressings to the thigh or head.

Use.

Application to thigh.

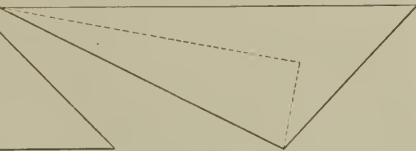
To apply the triangle to the thigh, the apex is folded

FIG. 63.



Triangle.

FIG. 64.



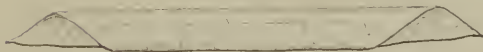
Folded for Hip.

FIG. 65.



Triangle Applied to Head.

FIG. 66.



Cravat.

a little more than half way to meet the base, as shown in the above illustration ; the longest extremity is then passed under the back and brought across to the opposite hip, the other extremity being carried obliquely over the anterior aspect of the thigh, then under, when it is carried up the posterior aspect to the waist line, where the bandage is secured ; the other intersections are also securely pinned with small safety pins.

Head. In applying this bandage to the head, the base is placed upon the forehead and is then carried to the occiput where the extremities cross, passing around to the forehead, where they are secured.

The cravat. The cravat is prepared from the triangle by bringing the apex to its base and folding it a number of times upon itself until the desired width is secured.

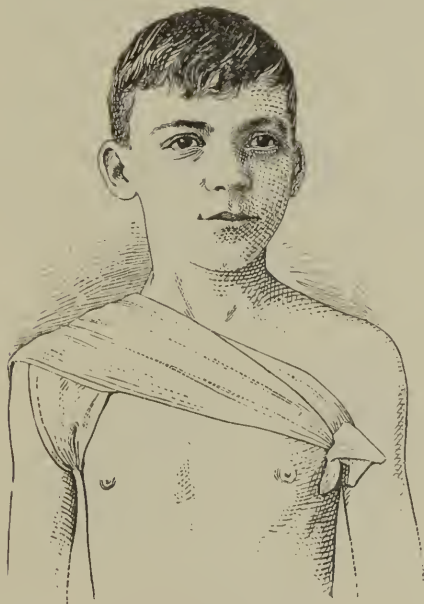
Use and application. The cravat is used to retain dressings in the axilla, and is applied by placing the body of the cravat in the axilla of the affected side, crossing the extremities of the bandage over the corresponding shoulder ; then carry them over the chest, one before and the other behind, to the axilla, where they are secured. To apply this bandage a piece of muslin $1\frac{1}{4}$ yards long folded into a cravat is required.

The cord. The cord is made by twisting the cravat upon itself. This form of the handkerchief bandage is used in applying "The Spanish Windlass."

Barton's handkerchief extension. In Barton's handkerchief, used in making extension to the leg or thigh, the handkerchief is folded into a narrow cravat, the body of which is placed upon the os calcis, below the insertion of the tendo-Achilles, so that

two-thirds of the cravat come around the outer malleus, leaving the other third upon the inside; the inside

FIG. 67.



Cravat Applied to Axilla.

FIG. 68.



The Cord.

portion being kept parallel with the sole of the foot, the outside piece being carried over the instep and then

carried around it forming a knot, and also passed under the sole of the foot and turned around the first turn to form another knot at the metatarsal articulation, where both ends are carried off perpendicularly from the foot.

Liebreich's
eye band-
age.

This bandage consists of a strip of flannel $2\frac{1}{2}$ inches

FIG. 69.



Liebreich's Eye Bandage.

wide and from six to ten inches long, to the extremities of which are sewed tapes. It is also made of green Holland.

It may be applied to cover both eyes, or obliquely, to cover one eye only, and is secured by carrying the tapes around the head and tying them over the forehead.

This is a compound bandage consisting of a number of pieces of muslin, flannel, gauze, or any other material used for bandages. The material selected is torn into strips usually from $2\frac{1}{2}$ to 4 inches in width, long enough to encircle the part $1\frac{1}{2}$ times.

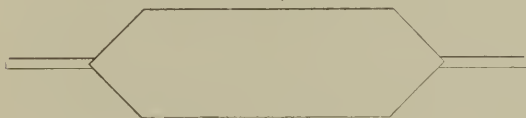
Bandage of
Scultetus.

Begin to make the bandage from above down, allowing the second strip to overlap the first one-half, and so on until the desired width is obtained. The bandage is then placed under the limb or part to be covered, and the pieces brought into place, beginning from below up. The extremities of the last strip are secured by a

Method of
making.

Application.

FIG. 70.



Liebreich's Eye Bandage.

small safety pin. This bandage will be found very convenient for retaining dressings to the limb in compound fractures, either of the leg or thigh; also in excision of the hip-joint where as little disturbance as possible is important in dressing the wounds; and in cases of laparotomy.

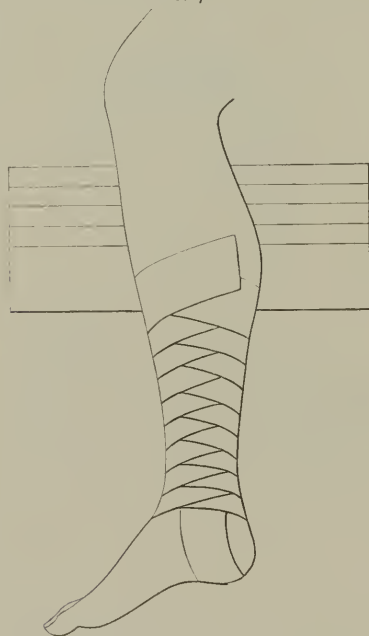
When the strips are attached to each other by a thread or piece of the material through the center, it is known as Pott's bandage.

Pott's band-
age.

In preparing either of these bandages for a case of compound fracture or excision of the joint, it will be found very convenient to make it upon a foundation of

parchment or wax paper cut the desired size. When the strips have been arranged upon the paper, fold it evenly upon itself from both ends toward the center, leaving a space a little wider than the posterior aspect

FIG. 71.



Bandage of Scultetus.

of the limb; slip one end under the limb, unfold your bandage and apply, beginning from below upward. When secured bring the paper up over the limb, so protecting the bed and clothing from all discharge.

CHAPTER XII.

FIXED DRESSINGS.

PLASTER-OF-PARIS—BAVARIAN DRESSING—STARCHED BANDAGE
—GUM-AND-CHALK BANDAGE—SILICATE OF SODIUM OR
POTASSIUM—PARAFFIN BANDAGE.

A variety of substances may be used in the applica-^{Fixed dress-}
tion of these dressings ; plaster-of-Paris, starch, silicate^{ings.}
of sodium or potassium, paraffin, or a mixture of gum
and chalk. Whatever substance may be employed is
first incorporated in the meshes of some open fabric,
such as crinoline or cheese-cloth, or is painted over the
surface of the bandage.

Plaster-of-Paris bandages are most commonly used^{Preparation}
and are prepared by taking crinoline, cheese-cloth, or^{of plaster-of}
gauze, which has been previously cut into strips from^{Paris band-}
two to four inches in width, five yards in length, and^{age.}
thoroughly rubbing the extra-calcined variety of dental
plaster into the meshes.

To do this evenly, lay the bandage across a table, rub
the plaster evenly over the surface of the material with
the left hand, while rolling it loosely with the other.
After the cylinder is formed, by giving it a gentle touch
it will roll upon itself just loose enough to be right.
When the entire bandage has been gone over and rolled,
wrap tightly in wax paper and place in an air-tight jar

or tin can until required. Whenever it is possible, the bandages should be freshly prepared before using them, as they set more quickly. If they have been kept for any length of time, place them in a hot oven for half an hour, when they will set as quickly as though freshly prepared. A little pulverized alum added to the water in which the bandages are wet, will also help them to set more quickly. If gauze or cheese-cloth be used, it will be found very convenient to wind them over a round stick the width of the bandage, removing it before the bandage is placed in the water. Plaster-of-Paris bandages should never be wound by machine, as they are wound too tightly and the plaster is not apt to be so evenly distributed.

Mode of
application.

The plaster-of-Paris dressing may be applied either by covering the part to be enclosed by some loose fabric, and rubbing the moist plaster into it, or alternating the layers of the fabric with the moist plaster, until the desired thickness has been obtained, or by means of a continuous roller previously prepared. Sometimes a posterior or lateral splint is prepared from the plaster bandage and confined to the limb by spiral turns.

First
method.

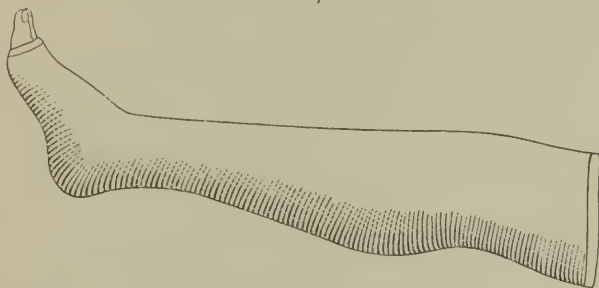
To apply a plaster dressing according to the first method, the part to be enclosed, the leg, for instance, should be first covered by a neatly applied flannel bandage, and bony prominences being padded to prevent undue pressure upon them; the part is next covered by a layer or turns of crinoline, gauze, or cheese-cloth; a small quantity of plaster-of-Paris, previously moistened until it has the consistency of thick cream, is then

smear'd evenly over the entire surface of the previously applied bandage. Another layer of the material is then applied, to be in turn covered with the moist plaster, until a dressing of the desired thickness is obtained.

As in the first method, cover the part to be incased with an evenly applied flannel bandage or a closely fitting stocking, carefully protecting all the bony prominences with pads of cotton. Before applying, the bandage should be placed in sufficient warm water to entirely cover it,

Second
method of
application
of bandage.

FIG. 72.



Leg Incased in Plaster of-Paris Dressing.

remaining without handling, until the air bubbles cease to escape—a sign that it is thoroughly soaked; then squeeze out the excess of water and apply evenly and with just sufficient firmness to conform nicely to the part with as few reverses as possible. A sufficient number of bandages are applied to make the cast the desired thickness. When the last roller has been applied, the dressing is usually finished off with the plaster cream.

In preparing the moist plaster, use a small quantity of

Plaster
cream.

warm water, into which the plaster should be sifted gradually with the left hand, at the same time stirring it in one direction with the right, until it is as thick as rich cream; then apply evenly with the palm of the hand. When a sufficient quantity has been applied, rinse the hand in warm water and smooth off the plaster by light downward strokes. When the plaster has thoroughly set, trim off the edges and bind with adhesive plaster.

In applying these dressings narrow strips of tin, zinc, or binder's board are often incorporated in the dressing to give it additional support.

Third
method.
Posterior
plaster
splint.

In the third method pieces of plaster-of-Paris bandage are taken, sufficiently long and wide to reach from the knee to the middle of the dorsum of the foot and envelop the malleolus. When the splint has been made the desired thickness, it is adjusted and held firmly in place by turns of a plaster bandage.

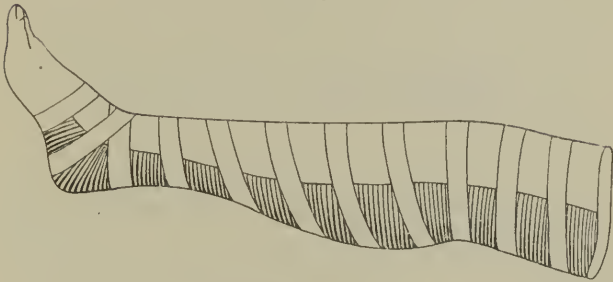
Interrupted
plaster
dressing.

Where there is an open wound and it is still desired to employ a fixed dressing, an interrupted or frustrated bandage is employed. If the wound be small, it may be covered by a pill box which can easily be cut out when the plaster has set, thus leaving the wound free.

When the wound is larger, a short iron rod is placed under the limb some distance above and below the point at which the dressing is to be interrupted; this is fixed by a few turns of a plaster bandage above and below that portion of the limb which is to be exposed; stout wire is then bent into loops, the ends being incorporated in the subsequent turns of the plaster bandage. Three

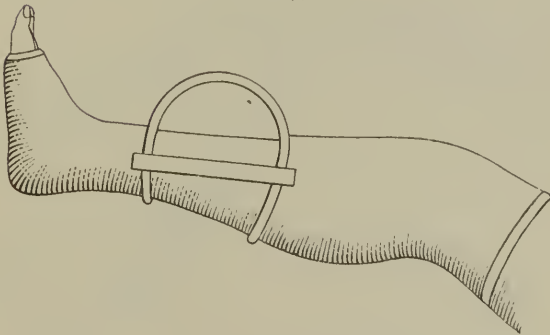
loops are usually placed in addition to the iron bar, and will usually make the dressing sufficiently firm. A num-

FIG. 73.



Posterior Plaster Splint.

FIG. 74.



Interrupted Plaster Dressing.

ber of turns of the bandage are applied to firmly fix the ends of the loops, and the leg is held in position until the plaster is firmly set.

Bavarian
dressing.

In preparing the Bavarian dressing, take two pieces of flannel the length of the limb and once and a half the circumference of the same, sew them securely together through the middle; place under the limb and fit accurately by means of pins, then trim off. Remove the flannel and place upon a table.

Prepare plaster-of-Paris cream and spread smoothly and thickly between the two pieces of flannel, then put together and place under the limb, taking care to have the seam in median line, bringing up the sides and moulding the same accurately to the limb, where it is confined by a roller bandage. Whenever it is necessary to remove the dressing, the turns of the roller are cut, and upon separating the layers of flannel, either or both halves may be turned aside, the seam at the back acting as a hinge.

Upon replacing the splint it may be retained by an ordinary roller or a few turns of plaster bandage.

Plaster
jackets.

Jackets constructed from plaster-of-Paris are largely employed in the treatment of spinal disease, and will be described in a subsequent chapter.

To remove
plaster-of-
Paris dress-
ings.

Plaster dressings may be removed by painting a line down the length of the dressing, with hydrochloric acid or strong salt water, either of which soften the plaster so that it can be readily cut. Hydrochloric acid is objectionable because it ruins any instrument which may be used in the cutting.

The most satisfactory way is to use a sharp knife or Hunter's saw. Dr. Wm. Barton Hopkins has devised a vertebrated metal chain which is wrapped in wax paper

and applied to the part. It is removed when the dressing has firmly set, leaving a hollow ridge which can be

FIG. 75.

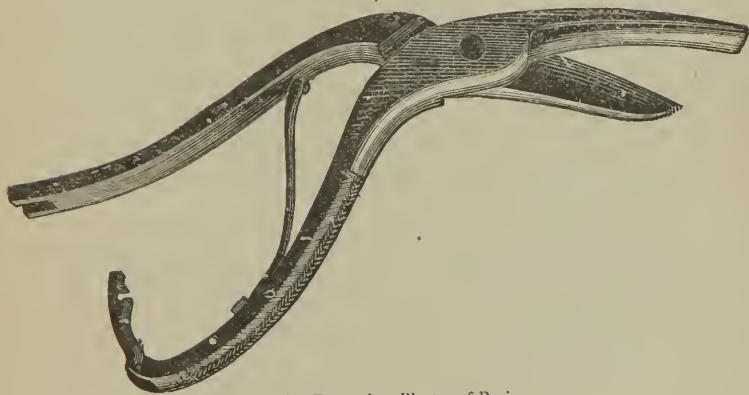


Plaster Saw.

easily cut through, first slipping a piece of sheet lead underneath.

In applying this dressing starch is first mixed with Starched bandage.

FIG. 76.



Scissors for Removing Plaster-of-Paris.

cold water until a thick creamy mixture is produced, when a sufficient quantity of boiling water is added to

make a clean mucilaginous liquid. If too thin it can be made thicker by boiling it a few minutes.

The part to which the dressing is to be applied is first covered by a flannel roller, and over this a few layers of cheese-cloth or crinoline bandage, which has been previously shrunk, are applied. The starch is then rubbed evenly into the meshes of the material, when another layer of bandage is applied.

This is repeated until a dressing of the desired thickness is attained. This bandage is now seldom used, as it requires from 24 to 36 hours to harden.

Gum and
chalk band-
age.

In this dressing equal parts of pulverized gum Arabic and precipitated chalk are mixed with boiling water until it reaches the consistency of cream, when it is applied in the same manner as the starch dressing. From five to six hours are required for it to harden.

Silicate of
sodium or
potassium.

The silicate of sodium or potassium bandage may be applied by means of a brush upon the part, which should be previously covered with cheese-cloth or washed crinoline; or the bandage may be dipped in solution and then applied.

The former is by far the better way. These dressings are frequently employed in place of the plaster-of-Paris, when it is desired to remove the dressings frequently; in which case they are arranged with hooks or eyelet holes and laced.

Paraffin

In applying this dressing, paraffin, which melts at from 105° to 120° Fahr., is employed. The limb is first covered with a flannel roller, when the vessel containing the paraffin is placed in a basin of boiling water.

As the cheese-cloth roller is unwound it is passed through the melted paraffin and applied to the part until a dressing of the desired thickness is obtained ; the surface is then brushed over with melted paraffin. This dressing sets rapidly, becoming quite firm in from five to ten minutes.

CHAPTER XIII.

SPLINTS AND BRACES.

USE OF SPLINTS—KINDS AND MODE OF APPLICATION—BRAN BAGS — SAND BAGS — EXTENSION APPARATUS — FRACTURE BOX—PREPARATION FOR DRESSING FRACTURES—BRACES FOR DEFORMITIES.

Use of
splints.

Splints are employed to keep the fragments of bone in apposition in cases of fracture or dislocation, or where it is desired to keep the limb at rest.

Kinds.

The simplest splints are made of wood, but they may also be constructed from tin, gutta-percha, leather, felt, binder's board, wire, plaster-of-Paris, or soap plaster.

Wooden
splints.

Wooden splints constructed from a smooth board of white pine, willow, or poplar, from one-eighth to one-half an inch in thickness, may be used either straight or angular, and are easily prepared.

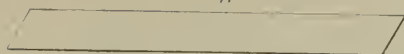
Preparation
of splint.

Before applying any splint it should be well padded with cotton, oakum, or lint ; and in the straight splints the padding is usually held in place by a roller bandage.

The straight splint is used in fractures or wounds of the hand, forearm, olecranon process of the ulna, leg, and patella ; in the latter case it should be sufficiently long to reach from the upper third of the thigh to a point just above the tendo-Achilles.

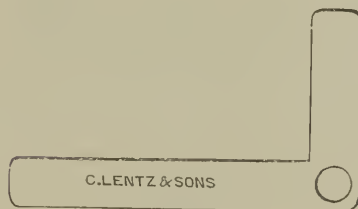
The angular splints are used in case of fracture or wound of the arm.

FIG. 77.



Straight Splint.

FIG. 78.



Internal Angular.

FIG. 79.



Acute Internal Angular.

FIG. 80.



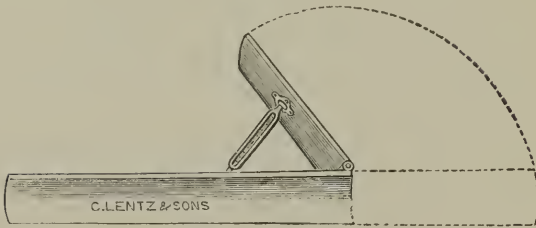
Obtuse Internal Angular.

FIG. 81.



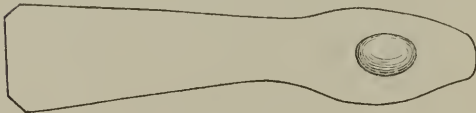
Anterior Angular.

FIG. 82.



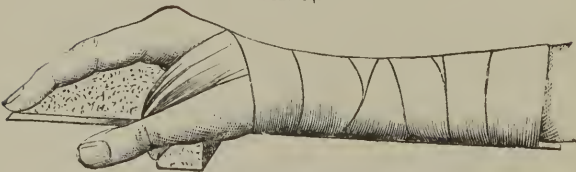
Stromeyer's Splint.

FIG. 83.



Agnew's Metacarpal Splint.

FIG. 84.



Straight Palmar.

Stromeyer's splint is employed for fracture or partial ankylosis of the elbow or knee-joint, the limb being straightened by means of a screw.

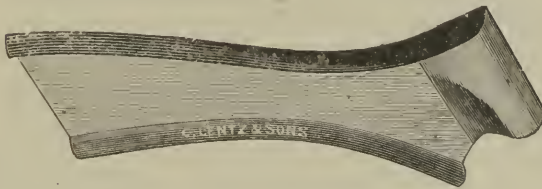
Agnew's metacarpal and the straight palmar splint are used in fracture or wounds of the hand.

Agnew's
metacarpal
and straight
palmar
splints.

Bond's splint is used in Colles' fracture. The mode of applying this splint varies, some surgeons using it well padded with small compresses upon the upper and lower fragments of bone, while others use simply a double fold of lint and larger compresses. A substitute

Bond's
splint.

FIG. 85.



Bond's Splint.

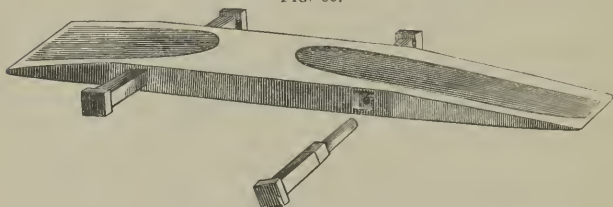
for Bond's splint may be prepared by fastening a roller bandage obliquely upon a straight wooden splint.

Agnew's splint, which is provided with four pegs for the attachment of strips of adhesive plaster, is used in cases of fracture of the patella, in place of the long straight splint used by some surgeons. A small compress of lint is placed above the upper fragment, and another below the lower fragment. A strip of adhesive plaster, $1\frac{1}{2}$ inches wide and 24 inches long, is then applied with its middle portion placed over the upper

Agnew's
splint for
fractured
patella.

compress, the ends being brought obliquely downward and fastened to the lower pegs, the object of these

FIG. 86.



Agnew's Splint for Fracture of the Patella.

strips being to bring the upper fragment in contact with the lower fragment.

FIG. 87.



Hamilton's Splint for Fractured Patella.

A similar strip of adhesive plaster with the ends passing in the opposite direction, is then placed upon the lower fragment and the ends fastened to the upper pegs.

The lower strips serve only to steady the lower fragments. Two or three of these strips are sometimes applied above and below where the screws are turned until the strips are sufficiently tightened.

Sometimes the strips fit better when cut in the shape of a crescent. When the strips have been properly tightened, the splint is brought in firm contact with the limb by the application of a roller bandage.

The limb is then placed upon an inclined plane or a long fracture box with its foot elevated, to relax the quadriceps femoris muscle. The foot of the bed should also be elevated to keep the patient from slipping down.

This splint is made of wood accurately shaped to the outline of the back of the limb, and beveled at its upper end. The part corresponding to the knee is cut out, and the thigh and leg parts strongly backed together, a movable foot-piece serving to steadily support the foot. The knee part slides in and out, so that the dressing can be changed without moving the limb. Leather strips with lacings are used to retain the limb in position ; or bandages or adhesive strips may be used.

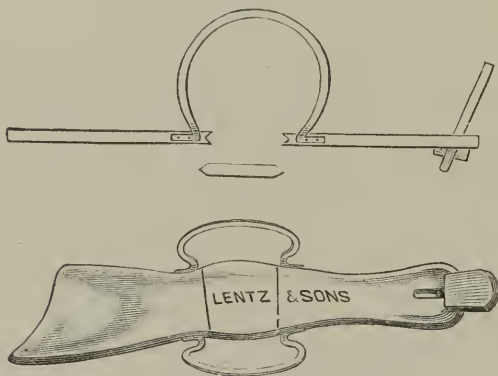
Packard's
splint for
knee ex-
cisions.

In this dressing for fracture of the shaft of the femur, the lateral support is given to the limb by the application of two wooden splints, the outer or long one extending from the axilla to the ankle, the inner or short one extending from the ankle to the groin. The splints should be about $3\frac{1}{2}$ inches in width at the lower extremity, the outer one from five to six inches wide at the upper extremity, while the inner one should corre-

Dr. Ash-
hurst's
dressing for
fracture of
the shaft of
femur.

spond at its upper extremity, with the width of the outer splint at the point opposite the groin. The splints are wrapped in a splint cloth made of a single width of canvas about three-quarters of a yard long, leaving a space in the center to correspond to the shape of the limb and, sufficiently wide to interpose bran-bags between the splints and the limb. Or the cloth may be laid

FIG. 88.



Packard's Splints for Knee Excisions.

under the limb and the splints fixed in proper position. The outer bran-bag should reach from the ankle to the axilla, and the inner bag from the ankle to the groin. The entire dressing is made to conform closely to the limb, by three strips of bandage, one above and two below the knee, passed under and over the dressing, and securely tied, drawing the knots over the outer edge of the splint. A "binder," composed of a double fold

of muslin, is passed under and over the chest and long splint and securely pinned. A wad of oakum or cotton is then placed under the tendo-Achilles to relieve the pressure and the ordinary extension applied.

This makes an exceedingly comfortable dressing and the patient is easily handled.

Many surgeons prefer to use sand-bags in place of the long splints and bran-bags, in which case the bags are *almost* filled with dry, white sand, leaving sufficient room to flatten the bag at its upper extremity. The bags are

FIG. 89.



Long Splint for Fracture of Femur. (Ashurst.)

kept in accurate contact with the limb and body by means of the binder and strips of bandage. It is always best to protect the upper end of the inner bag, in either case, with a cap of oiled silk or muslin, to keep them fresh and clean.

After the application of the dressing, the thigh should be slightly abducted and kept in that position, the inner malleus, outer tuberosity of the knee, and the great trochanter being in line with one another.

The extension apparatus is constructed by taking a

Extension
apparatus.

piece of adhesive plaster (the machine-spread plaster is to be preferred to the rubber) two inches wide and long enough to extend from the outer side of the knee to three inches below the sole of the foot, and from this point back to the inner side of the knee. In the center of this strip is placed a block of wood about two inches wide and five inches in length for an adult, four inches for a child, with a perforation in its center; the block and the inner surface of the plaster are next faced with a similar strip to a point about one inch above the malleoli; another strip of plaster is passed around the block to fix the previously applied strips. The strip of plaster is then warmed or wet with ether and applied to the sides of the limb and held in position by two circular strips of plaster, one above the malleoli and the other below the knee. A roller bandage is then applied to the foot and limb, and carried to the knee.

Through the perforation in the center of the block or stirrup, is fastened a cord which passes over a pulley which is fastened to the bed or extension standard, and to this cord is attached the extension weight.

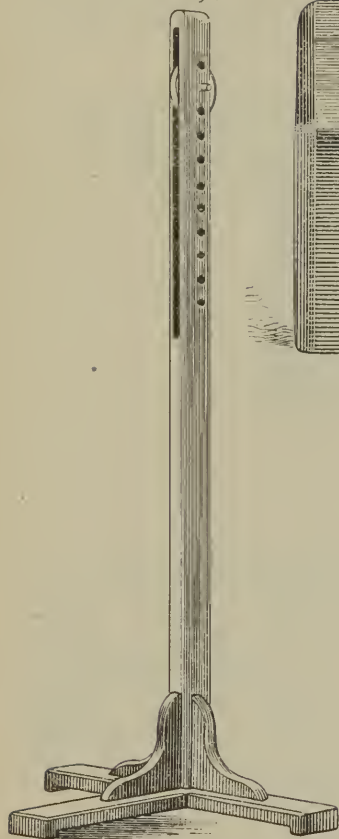
The foot of the bed should be elevated three or four inches, by means of blocks, to make counter extension.

Before applying the extension shave the limb carefully to prevent pain when the plaster is removed.

The dressing for fracture of one or both bones in the leg is usually best accomplished by means of a fracture box, which consists of a posterior splint with movable sides and a foot-piece.

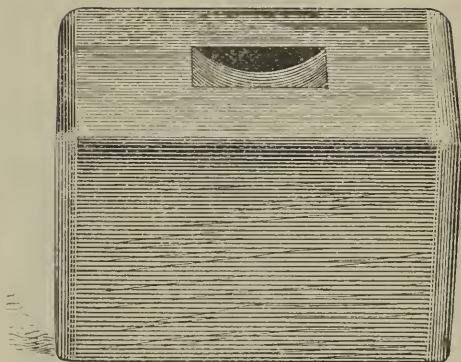
It may be single, double, or double inclined.

FIG. 90.



Extension Standard

FIG. 91.



Block for Elevating Foot of Bed.

FIG. 92.



Weight.

In preparing the box for the reception of the limb, the sides are lowered and a soft pillow full enough to

FIG. 93.

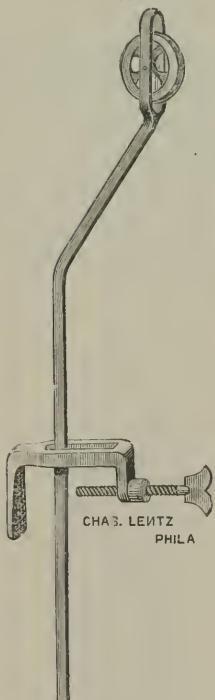


FIG. 94.

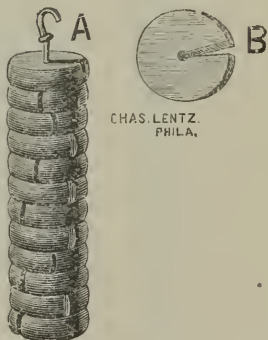
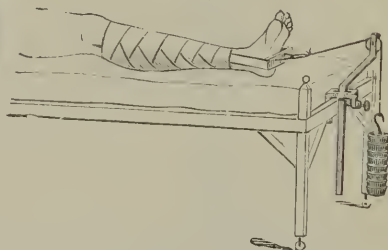


FIG. 95.

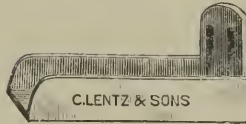


Dr. Levis's Apparatus.

make equable pressure upon the limb when the sides of the box are adjusted, is placed smoothly in it; two or

three strips of bandage long enough to pass under and

FIG. 96.



Single Fracture Box.

FIG. 97.

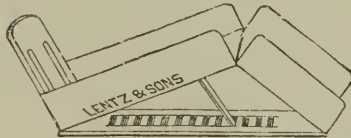
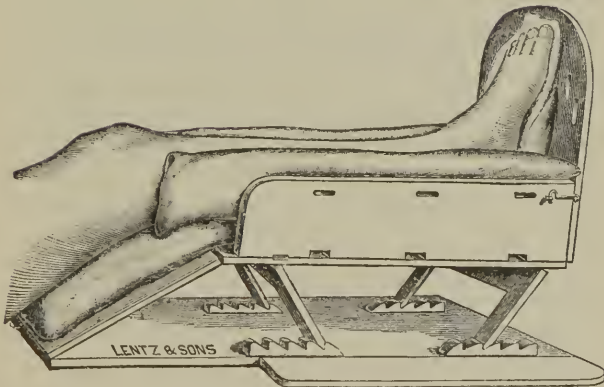


FIG. 98



Double Inclined Fracture Box.

across the box are slipped under and tied loosely or crossed upon the pillow; another strip of bandage

sufficiently long to cross over the foot, the ends passing through the slats in the foot-piece and tied, is then adjusted.

A pad of oakum or cotton is placed under the tendo-Achilles to relieve the heel from pressure; another pad or folded towel is placed between the sole of the foot and the foot-piece, the foot being drawn firmly against the board, and at right angles with the limb, where it is securely tied; the sides are then brought up and secured.

In the subsequent care of the fracture, care should be taken to keep the foot well down to the foot-board, and at a right angle with the leg, and that there is no eversion of the knee. The patient should also be kept in the recumbent position.

Whenever a wet dressing is used about the limb, the pillow should be protected by a Mackintosh pillow case.

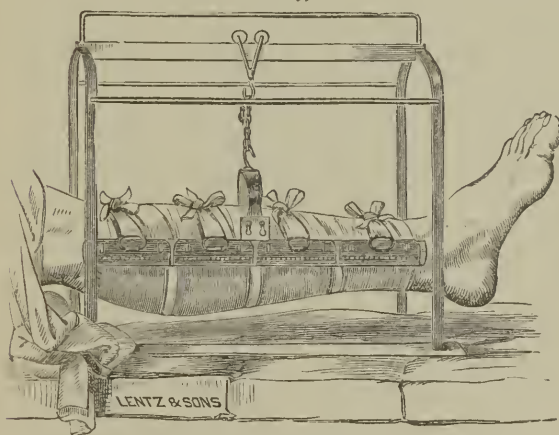
Preparation
for compound
fracture.

In preparing a fracture box for a compound fracture, it is a very good plan to arrange the dressing in a fresh fracture box, using a "Scultetus" bandage made from broad strips of gauze, the strips being laid upon wax or parchment paper in such a manner that it may be applied from below up. If cotton be used, place the cotton, of proper size, upon the bandage, then the superficial and deep dressing; fold the entire dressing from both sides to correspond to the width of the box. When the old dressing has been turned down and the limb is ready, simply change the box and adjust the dressing. If skillfully managed, it will cause almost no disturbance to the limb and can be accomplished in half the time. In some cases where the patient becomes restless,

the fracture box is swung from a frame fastened over the bed.

The old-fashioned tin splints are now replaced by ^{Leis's} metallic splints. those constructed from a very light metal made of a mixture of aluminum, copper, and bronze, nickel-plated and perforated to allow ventilation and the escape of

FIG. 99.



Salter's Fracture Cradle or Swing.

the secretions. The splints are so accurately fitted that they require little padding. A slight roughness is left on the outside of the splints by the perforations, to prevent the bandage from slipping. These splints are designed for treatment of fracture of the arm, elbow-joint, phalanges, clavicle, maxilla, femur, patella, tibia,

and fibula, and are the only splints made for infants under three years of age.

Gutta-percha splints.

Splints made from sheets of gutta-percha, from one-sixteenth to one-eighth of an inch in thickness, are sometimes used. It is prepared for use by immersing in hot water, when it becomes soft and can be readily molded to the surface of the body.

Undressed leather splints.

Undressed leather is also a good material from which to construct splints. It is softened by soaking in boiling water, then padded and molded to the part. It is often employed in making jackets for curvature of the spine.

Russian felt splints.

Russian felt, made from wool saturated with gum shellac and pressed into sheets, is an excellent material for splints. It should be shaped as nearly as possible to the limb to which it is to be applied, then placed between wet cloths and ironed with a *hot* iron until it is thoroughly softened. Before adjusting the splint, it is best to first apply a primary roller to the limb, then one splint confined by a roller, then the second splint, also held in position by a well applied roller. In cutting the splints for a leg it is best to take the circumference of the limb below the knee and above the ankle, thus shaping the splint, allowing one inch between the margins of the felt, which should be beveled a little. When the fracture is in the middle third of the limb, the foot-piece is sometimes cut off. This gives an exceedingly light splint and is very comfortable to the patient.

Binder's board.

Binder's board may be used for the same purpose, and should first be immersed in hot water until it is

sufficiently soft to be readily molded to the part; it is then padded with raw cotton and applied by means of a roller bandage.

Some special splints are constructed from wire, notably Prof. Ashhurst's splint for resection of the knee, and Prof. N. R. Smith's anterior splint for fracture of

Wire
splints.

FIG. 100.



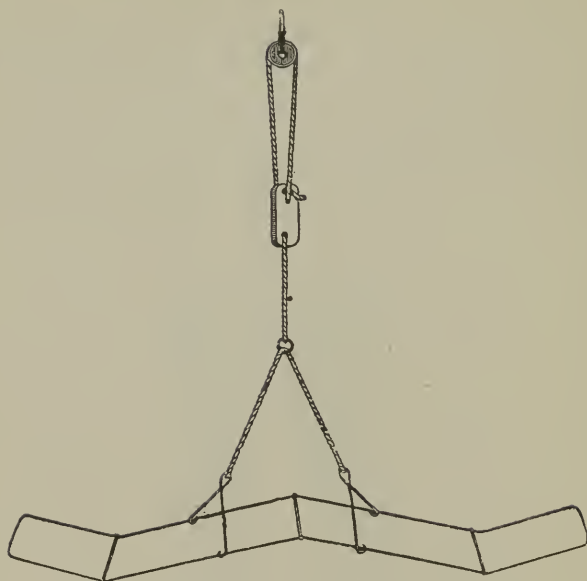
Moulded Splints of Felt or Binder's Board.

the leg and thigh, by which the entire limb is swung, thus allowing the patient to move about in bed without disturbing the limb.

The splint employed by Dr. Jno. Ashhurst, Jr., for resection of the knee-joint, consists of a posterior wire splint with an adjustable foot-piece. The portion marked A A is composed of wire basket work, and in

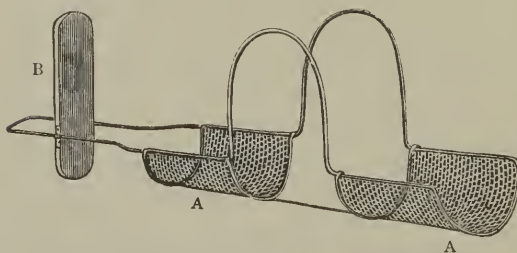
Prof. Jno.
Ashhurst's
splint for
resection of
knee.

FIG. 101.



Prof. N. R. Smith's Anterior Splint for Fractured Thigh.

FIG. 102.



Dr. Ashhurst's Splint for Resection of Knee-joint.

preparing the splint for use, is well padded with oakum covered with lint securely sewed ; this, in turn, is covered with oiled silk. The foot-piece, B, is accurately adjusted and is then also padded with oakum covered with lint.

The framework is then neatly covered with bandage or other material.

The limb is placed in position, the knee filling the open space between the basket work, the foot adjusted and the splint held in position by means of adhesive strips.

A "Scultetus" bandage to fit the opening is arranged upon parchment paper, the dressing placed upon it, and the whole slipped under the limb and brought up in position through the curved bars. A roller bandage is then applied in such a manner that the dressing may be readily changed without disturbing the splint. The successive dressings are arranged in the same manner upon a "Scultetus" and slipped into place.

Soap-plaster for surgical purposes is prepared by spreading emplastrum saponis upon kid or chamois to a thickness of a quarter of an inch. It is frequently employed in the treatment of sprains, or in old fracture where it is necessary to give the limb some support.

It is readily molded to the part and held in position by a roller bandage. It is also used over bony prominences before applying other splints, and may be applied to other parts of the body where pressure-sores are apt to occur.

Plaster-of-Paris may be employed in the construction Plaster-of-Paris splints.

of splints, either movable or fixed, and have been previously described.

Orthopædic
apparatus.

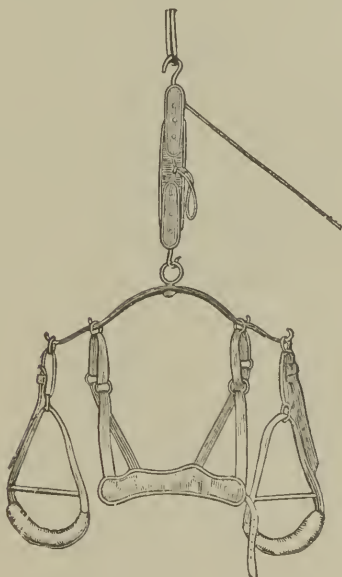
Jackets made of plaster-of-Paris are largely employed in the treatment of spinal disease. Before applying the plaster the body of the patient should be covered with a soft, closely-fitting woven shirt without sleeves, or sometimes stockinet or a flannel bandage is used. A pad consisting of several thicknesses, or a wad of cotton, is placed over the abdomen between the shirt and the skin, called the "dinner pad," which is removed when the plaster has set, thus allowing space for the distention of the abdomen after eating. Small pads of raw cotton should also be placed over the anterior iliac spines.

The patient is then suspended, either by Prof. Sayre's apparatus, or in a hammock made of cheese-cloth.

Prof. Sayre's apparatus consists of a curved iron cross beam, to which is attached an adjustable head and chin collar, with straps fitted to axillary bands. To a hook in the center is attached a compound pulley, the other end of which is secured either to a hook in the ceiling or to the top of an iron or wooden tripod about ten feet high. The head and chin collar and axillary straps are adjusted, and the patient is then slowly raised until only the toes touch the floor. This position is maintained by the aid of an assistant. The shirt should be well drawn down over the hips and held in position until a few turns of the bandage have been applied. The turns of the bandage should be applied evenly and not too tightly, and are repeated until a dressing of the desired

thickness is obtained, when the jacket may be finished off with the moist plaster, binding the edges with adhesive plaster. Sometimes strips of zinc or tin are placed

FIG. 103.



Sayre's Suspension Apparatus.

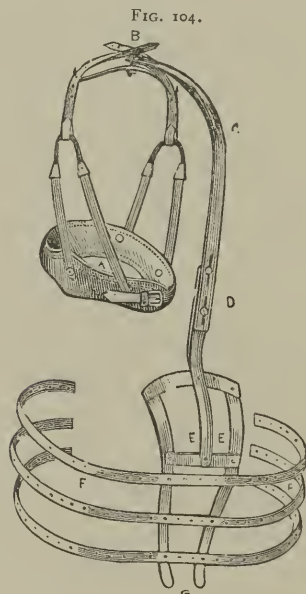
between the layers of the bandage, to give additional strength to the dressing.

In disease of the spine involving the cervical or upper dorsal vertebra the "jury-mast" is employed in connection with the plaster jacket. The apparatus con-

Jury-mast
incorporated
with plaster
jacket.

sists of two bars of malleable iron bent to fit the curve of the back.

To the lower portion are attached two or more roughened tin strips long enough to go nearly around the



Jury-mast and Head Support.

body. A central shaft, carried in a curve over the head and capable of being elongated at will, springs from between the two cross-pieces of the upper extremity of the iron pieces.

To the upper extremity of this is attached a swivel

cross-bar with hooks, from which depend straps supporting the head and chin collar.

After a few thicknesses of the plaster roller have been applied, the "jury-mast" is adjusted, care being taken that the malleable iron strips are bent to conform to the surface of the plaster, and that the shaft over the head be kept in line with the spinous processes.

The perforated tins are carried around the body, but should not be allowed to meet. The apparatus having been thus adjusted, additional layers of plaster bandage are applied to hold the instrument firmly in place.

Some surgeons employ a hammock made of cheese-cloth in place of Prof. Sayre's apparatus in applying a plaster jacket, when the patient is a child. The hammock is made of two or three thicknesses of cheese-cloth swung from pulleys. The child is laid in the hammock, extension being made from the feet and shoulders; the cheese-cloth is cut at the axilla and at the curve of the hip, and fitted closely to the body, the plaster bandages being applied over the cheese-cloth and finished in the usual manner. When the plaster has thoroughly set, the superfluous cheese-cloth is cut away and the child lifted down.

Application
of plaster
jacket by
means of a
hammock.

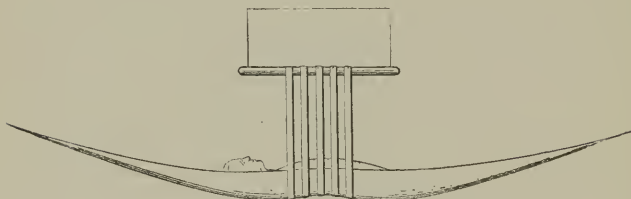
Sometimes the jackets are made to lace up in front when it is thought desirable to remove it at night.

Dr. T. W. Sloan, of Seattle, Washington, has devised another method of employing the hammock. Instead of cutting it at the axilla and curve of the hip, it is made to conform to the body by means of gauze bandages hung from a horizontal bar. Whenever the hammock

Dr. T. W.
Sloan's
method.

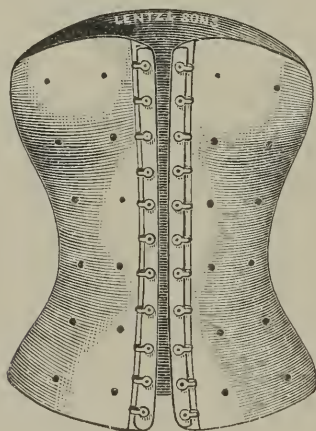
is employed, a long table is usually placed under the patient, to prevent danger from falling.

FIG. 105.



Dr. T. W. Sloan's Method.

FIG. 106.



Spinal Jacket of Leather.

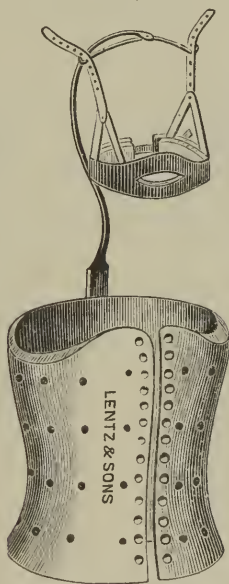
Spinal
brace.

In many cases braces made of steel, leather, or aluminum are employed in the treatment of spinal diseases, in

preference to the plaster-of-Paris jackets, as they are lighter and cooler, and can be readily removed.

When made of hardened sole leather, a mold of the

FIG. 107.



Spinal Jacket with Jury-mast.

body is taken by means of the plaster-of-Paris jacket, over which the leather is accurately fitted.

It can be made with or without the jury mast.

The steel brace made by Max Woche & Son, of Cincinnati, consists of a well-padded steel pelvic band, to

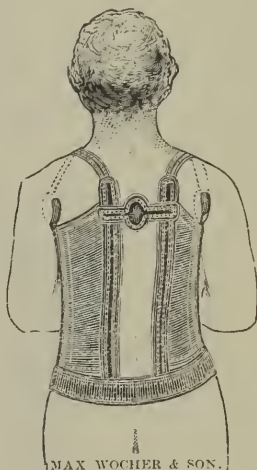
Steel or
aluminum.

the posterior portion of which upright bars are fastened, shaped to conform to the curve of the spine. To these bars strong cloth or jean belts are attached, which encircle the trunk and lace in front, and thus firmly adjust the apparatus to the body, at the same time sustaining

FIG. 108.



FIG. 109.



Max Woche's Spinal Brace.

the lower part of the body (the abdomen) in an upright direction. Two adjustable crutches are attached laterally which elevate the body by pressure mostly under the margin of the scapulæ, and also remove the weight of the head and shoulders from the spine. The same brace may be made without the crutches and with pads,

to correct the curvature. In applying these braces, the patient should be made to lie perfectly flat upon the back; the brace is then placed in position, being careful to have the pads in their proper position, then lace, and adjust the shoulder straps, which should be made as tight as can be comfortably borne, so that the brace does not slip.

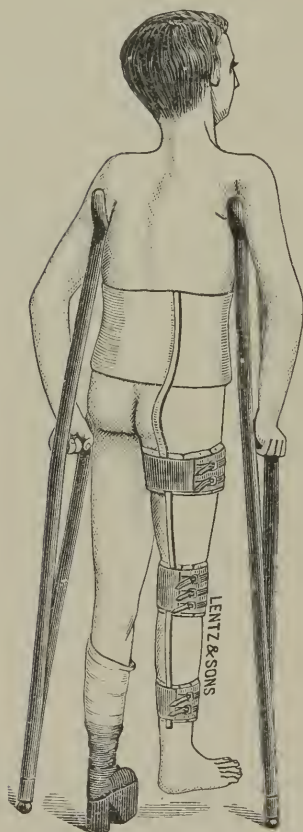
If carefully adjusted, it remains in perfect position and is comfortable to the patient. Hip braces.

Dr. Thomas's hip splint consists of a pelvic band to which is attached a posterior bar of steel covered with leather and extending down over the buttock, fitting closely against the leg to just above the ankle. There is a band around the thigh and one directly over the knee, and at the bottom above the ankle. A pelvic band of muslin is secured in front by means of straps and buckles, to hold the upper portion of the splint firmly in place. When this apparatus is firmly applied, there is no possibility of motion at the hip-joint in any position in which the patient may place himself. A cork-sole shoe $2\frac{1}{2}$ inches high is worn on the well foot and crutches applied. Dr. Thomas' splint.

Dr. Taylor's long hip splint consists of a pelvic band to which is attached a lateral bar extending from the crest of the ilium to sole of foot, ending in a foot-piece to which two perpendicular straps are attached. A second strap passes around the thigh. Counter extension is made by means of two perineal pads fastened to the pelvic band with straps and buckles. Dr. Taylor's brace.

Before applying the brace the patient should be laid

FIG. 110.



Dr. Thomas's Hip-joint Apparatus.

upon his back, and care should be taken that the pelvis is not inclined forward by contractions of the flexor muscles. Should this be the case, elevate the limb until the lumbar vertebra touches the bed and the spinal column assumes its normal position. Then apply the splint.

Two pieces of adhesive plaster terminating in a buckle are applied to either side of the limb, the buckles coming about two inches above the malleoli.

A few turns of a roller bandage are then applied around the ankle in such a manner as to protect the flesh under the buckles, and then continued up to the knee.

The foot-piece is adjusted to the desired amount of extension and held in that position by means of the perpendicular straps. The perineal straps are so adjusted that the patient sits firmly and comfortably upon them. The foot is dressed with a shoe in the ordinary manner, and a cork-sole shoe is worn upon the sound limb. At first the patient will be obliged to use crutches, but after learning to manage the brace, walks nicely without. This brace may be worn at night, thus keeping up constant extension.

FIG. 111.



Taylor Brace.

CHAPTER XIV.

MASSAGE.

Definition. Massage is the systematic and scientific method of improving the nutrition of different parts of the body by means of rubbing and kneading upon the nude skin.

It is particularly useful when the circulation is impaired and when it is desired to promote flexibility in the muscles.

Divisions. Dr. Mezger divides the treatment into four different manipulations.

1st. Effleurage,

2d. Frictions,

3d. Pétrissage,

4th. Tapotement.

Effleurage. Effleurage consists of centripetal (toward the head) strokings, and is performed in four different ways :—

Stroking with the palm of one or both hands.

Stroking with the thumb.

Stroking with the tips of the fingers.

Stroking with one hand is used upon the extremities, in single massage of the neck and the back of the head.

Stroking with both hands is used upon the lower extremities in adults, in double massage of the neck, and also upon the chest and back.

Stroking with the thumb is used between two muscles, or between a muscle and a tendon.

Stroking with the tips of the fingers is principally used around the joints after sprains, etc.

The aim of all strokings is to increase the circulation of the venous blood-vessels and lymphatics, thus causing absorption.

Frictions are firm circular movements always fol- Frictions.
lowed by centripetal strokings; they are usually performed over one group of muscles at a time, and are given in three different ways:—

Friction with the thumb.

Friction with one hand.

Friction with the tips of the fingers.

Friction with the thumb is used upon the extremities, also around the knee-joint, and upon the facial muscles.

Friction with one hand is used upon the larger surfaces and the fleshier parts, for instance, the thigh, arm, and lumbar region.

All frictions should be centripetal and followed by centripetal strokings. The aim of this manipulation is to transform pathologically changed parts into such a condition that they may be incorporated into the healthy tissues, and so be absorbed by the veins and lymphatics.

Pétrissage or kneading is performed in such a manner as to cause a double centripetal pressure upon a muscle or tendon, at the same time raising it from its point of attachment; and is performed in three different ways:—

Kneading with both thumbs.

Kneading with thumb and fingers.

Kneading with both hands.

Kneading with both thumbs is used to reach the separate muscles.

Kneading with the thumb and fingers, called pinching, is preferred on a deep-seated tissue, and is also employed to reach individual muscles.

Kneading with both hands, or squeezing, is used upon the arm proper and the lower extremities of adults.

The aim of kneading is to reach the individual muscles with a firm double pressure, and subject them to an action similar to that of friction.

Tapotement
or percus-
sion.

Tapotement or percussion is always performed from the operator's wrist, the hands striking quickly, and is performed in four different ways :—

1st. Clapping, performed with the palm of the hands, acting upon the skin and the superficial nerves and vessels.

2d. Hacking, performed with the ulna border of the hand, used around the nerve centers and upon the muscles.

Punctuation, performed with the tips of the fingers, used upon the head and in circles around the heart.

Beating is performed with the clenched hand, and is used upon the lower extremities over the sciatic nerve and upon the glutei.

Requisites
for good
masseur.

In order to give massage successfully, the nurse must have a good physique, gentle touch, pliable skin, be perfectly strong and well, with well developed muscles. She should be attired in a loose dress and be scrupulously clean.

The operator should have a good general knowledge

of anatomy, and must bear in mind the direction of veins and lymphatics, which, in the lower extremity, converge toward the groin and in the upper extremities toward the armpits or axilla.

The patient should lie upon a moderately firm bed, and be covered with a blanket. Or a more convenient and comfortable covering may be made by using a piece of white flannel, twice the length of the patient, folding it lengthwise; cut a hole in the fold through which the head may be passed, allowing the arms to remain outside; the edges may be fastened together with safety pins.

In giving general massage the following order is usually observed :—

- 1st. Toes and foot.
- 2d. Leg and knee.
- 3d. Thigh.
- 4th. Arms.
- 5th. Chest.
- 6th. Abdomen.
- 7th. Back.

It will be found more convenient to begin with the left foot and leg, then have the patient turn over on the other side of the bed, where the rest of the treatment may be easily given.

Great care should be taken that the patient is not exposed in any way during or immediately after the treatment, as after a little rubbing the temperature will begin to rise and the patient will readily take cold.

Massage should never be given when the skin is

Preparation
of patient.

Order of
giving.

Contraindications for
massage.

abraded or bruised, hence should not be employed in **skin affections**, in tumors or purulent inflammations, diseases of the kidneys, in acute disease of the bone tissue, pregnancy, or in any case where the pressure is liable to cause a hemorrhage.

Indications
for massage.

It is beneficial in spinal disease, paralysis, constipation, in club-foot, and in the after-treatment of fractures and sprains.

Massage may be given to the entire body in from 30 to 35 minutes; but the first séance should not last over 20 minutes.

Be very gentle at first and do not tire the patient.

Use the utmost care in giving massage after a fracture.

In all sprains use friction, kneading, rolling, and light percussion.

Lateral curvature of the spine is due to weakness of the muscles on one side. The muscles on both sides of the spine are reached by friction.

To learn massage thoroughly requires a systematic course of instruction, and considerable practice.

APPENDIX A.

INVALID COOKERY.

BARLEY WATER—IMPERIAL DRINK—WHITE WINE WHEY—EGG-
AND-BRANDY MIXTURE—EGG FLIP—FLAXSEED TEA—BEEF
TEA—BEEF TEA AND EGG—CHICKEN TEA—CLAM BOUIL-
LON—LEMON JELLY—BEEF JUICE—SNOW PUDDING.

Wash thoroughly two ounces of pearl barley, and place ^{Barley} in a saucepan with two quarts of water. ^{water.} Boil for two hours or more until the barley is quite soft, stirring and skimming occasionally. Strain through muslin and sweeten to taste. If allowable, a little lemon juice may be added, which improves the taste.

Place a dessertspoonful of cream of tartar and two ^{Imperial} tablespoonfuls of powdered sugar in a jug. ^{drink.} Pare the rind of a lemon very thin, and cutting it into little slices, place them in the jug. Pour one quart of boiling water over it, cover, and allow it to stand until it is cold, then strain it. (“Manual of Nursing,” Humphry.)

To half a pint of boiling milk add one or two wine- ^{White wine} glassfuls of sherry; strain through a fine sieve, sweeten ^{whey.} to taste with sifted sugar, and serve.

Beat up three eggs to a froth in four ounces of cold ^{Egg and} water, and then add four ounces of brandy. ^{brandy} Mix well, ^{mixture.}

and sweeten to taste. A little nutmeg may be added. Give a tablespoonful or so at a time, as directed.

Egg flip.

Beat an ounce of powdered sugar and the yolks of two eggs together, adding eight tablespoonfuls of brandy and eight tablespoonfuls of cinnamon water previously mixed together.

Flaxseed tea.

Take one ounce of white sugar and the same quantity of whole flaxseed, adding four tablespoonfuls of lemon juice. Place in a jug and pour over it one quart of boiling water. Allow the mixture to stand in a warm place four hours. Then strain and use.

This drink should not be given to patients who are taking iron, lead, or copper as medicines.

Beef tea.

Cut one pound of lean beef into small pieces; put it into a covered jar with one pint of cold water and a little salt. Allow it to simmer for a couple of hours, but do not let it reach the boiling point until two or three minutes before taking it from the fire.

Beef tea and egg.

Beat the white of an egg to a light froth, and add to it, very gradually, a teacupful of beef or chicken tea, which must be hot, but not boiling.

Chicken tea.

Take a small chicken, free it from skin and from all fat between the muscles; and dividing it lengthwise, remove the whole of the lungs, liver, and everything adhering to the back and side bones.

Then cut it, bones and muscles, with a strong sharp knife, into as thin slices as possible; place in a saucepan with a sufficient quantity of salt, and pour over it

one quart of boiling water. Cover the pan and simmer with a slow fire for two hours.

Allow it to stand for half an hour, then strain through a sieve.

Take three large clams, and allow them to stand in ^{Clam} boiling water until the shells begin to open. Drain out ^{bouillon.} the liquor, add an equal quantity of boiling water, a teaspoonful of finely pulverized cracker crumbs, a little butter, and salt to taste.

One box of gelatin, juice of four lemons and rind ^{Lemon jelly.} of three. Pour over this one quart of cold water and let it stand four hours, then add one quart boiling water and $1\frac{3}{4}$ pounds of granulated sugar. If wine be used, one pint of water. Strain through a fine sieve, turn into a mold, and set on ice or in a cold place.

Place half a pound of lean, juicy meat upon a broiler ^{Beef-juice} over a clear, hot fire, and heat it through. Press out the juice with a lemon-squeezer into a hot teacup. Add salt to taste.

Dissolve one-half box of Cox gelatin in one pint of ^{Snow pud} boiling water. Add two cups of white sugar and the ^{ding.} juice of one lemon. When it begins to thicken, add the whites of three eggs thoroughly beaten.

Sauce.—Boil one pint of milk and add the yolks of three eggs, one tablespoonful of corn starch, half a cup of white sugar.

APPENDIX B.

NUTRIENT ENEMA—ICE POULTICE—EXCESSIVE PERSPIRATION—
TABLE OF WEIGHTS AND MEASURES—BICHLORID TABLE
—POISONS.

Nutrient
enema.

Three ounces of strong beef tea, the yelk of one egg, and an ounce of brandy. Given at a temperature of 90° to 100° Fahr. Inject slowly directly after a natural movement, or about an hour after the bowels have been washed out with a simple enema.

Ice poultice.

Take a fold of gutta-percha tissue a little larger than the area to be covered. Sprinkle a thin layer of ground flaxseed upon the lower leaf; and upon that, crushed ice to the depth of half an inch; sprinkle the ice with salt, and upon that, another layer of flaxseed. Turn the upper leaf over the lower one and seal the edges with chloroform or turpentine; put the poultice into a flannel bag, and place under it a layer of lint. ("Guy's Pharm.")

Excessive
perspira-
tion.

Keep all the functions of the body in healthy condition, and when suffering from the trouble in axilla, avoid as much as possible the use of rubber dress shields; bathe frequently and apply dusting powder composed of equal parts of pulv. boric acid and Lubin's toilet powder. If, notwithstanding extreme cleanliness and the

use of the powder, the condition does not improve, use diluted ammonia or alum and camphor water.

Alum,* gr. xl
Aqua camphorus, f ℥ viij.

Wash axilla, dry thoroughly, and apply by means of absorbent cotton.

DRY MEASURE.

Weights.

gr.j	Signifies one grain.		
℥j	"	one scruple	= 20 grains.
℥ss	"	half a drachm	= 30 grains.
℥j	"	one drachm	= 60 grains.
℥ss	"	half an ounce	= 4 drachms.
℥j	"	one ounce	= 8 drachms.
lb.j	"	one pound	= 16 ounces.

FLUID MEASURE.

Measures.

℥j	Signifies one minim (about one drop).		
f ℥j	"	one fluidrachm	= 60 minims = one teaspoonful.
f ℥ij	"	two fluidrachms	= one small dessertspoonful.
f ℥ss	"	half a fluidounce	= one small tablespoonful.
f ℥j	"	one fluidounce	= two small tablespoonfuls.
Oj	"	one pint	= 20 fluidounces.

* Lecture delivered by Dr. Neilson.

BICHLORID TABLE.*

To make one pint of a solution the strength of:	Take of the solution containing fifteen grains in one fluidounce :	Equivalent to below stated amount of Bichlorid of Mercury :
I in 500,	1 fluidounce	15 grains
I in 1,000,	4 fluidrachms	7 $\frac{1}{2}$ "
I in 1,000,	3 "	5 "
I in 2,000,	2 "	3 $\frac{3}{4}$ "
I in 4,000,	60 minims	1 $\frac{7}{8}$ "
I in 5,000,	48 "	1 $\frac{1}{2}$ "
I in 6,000,	40 "	1 $\frac{1}{4}$ "
I in 8,000,	30 "	$\frac{1}{6}$ "
I in 10,000,	24 "	$\frac{3}{8}$ "
I in 12,000,	20 "	$\frac{5}{8}$ "
I in 15,000,	16 "	$\frac{1}{2}$ "

Poisons and
antidotes.

POISONS.

POISONS.

ANTIDOTES.

Acetate of lead.

Emetics and stomach pump: sulphate magnesia, or phosphates of soda and magnesia.

Acid, acetic, hydrochloric,
nitric, sulphuric, tartaric.

Magnesia, chalk, wall-plaster, lime water, whiting, soap-water, milk, oil, demulcents.

Acid, carbolic.

Raw eggs, olive oil, powdered chalk, milk, demulcents, emetics.

Acid, oxalic.

Chalk, common whiting, or magnesia suspended in water, emetics.

Aconite.

Emetics of sulphate of zinc, stomach pump, stimulants, as brandy, ammonia, strong coffee.

Alcohol.

Stomach pump, emetics, cold affusion, carbonate of ammonia.

* Pennsylvania Hospital.

POISONS.	ANTIDOTES.
Alkalies, ammonia, potash, soda.	Weak acids, as vinegar, lemon juice or citric acid, and water, followed by olive oil in large quantities.
Atropin, belladonna, hyoscyamus.	Stomach pump, emetic of sulphate of zinc, ammonia and stimulants, tannin, opiates.
Caustic, lunar.	Salt, white of egg or milk.
Corrosive sublimate (or other preparation of mercury).	White of eggs, flour in milk or water, emetics.
Digitalis.	Stomach pump, emetics, tannin, stimulants, cathartics, recumbent position.
Irritant Gases — Carbonic acid, chlorine, nitric acid, hydrochloric acid.	Pure air, inhalation of ammonia, ether, or vapor of warm water, artificial respiration.
Iodoform or iodine.	Stomach pump, demulcent drinks.
Lead, sugar of.	Emetics, Epsom salts.
Phosphorus (in phosphorus paste or rat poison).	Large quantities of water, lime water; no oils.
Prussic acid.	Fresh air, cold affusion, smelling salts, brandy.
Morphin, opium, opium preparations, chloral hydrate.	The stomach pump, emetic of sulphate of zinc, external stimulation, exertion.
Chloroform, chloral, amyl nitrite, ether.	Fresh air, cold affusion, ammonia to the nostrils, artificial respiration, counter-irritants, cathartics.
Strychnia or nux vomica.	An emetic or stomach pump, large doses of chloral, inhalations of ether.

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
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